BLM
Black Rock Field Office/Winnemucca, Nevada

DRAFT ENVIRONMENTAL IMPACT STATEMENT

DOI-BLM-NV-W030-2011-0001-EIS

Hycroft Mine Expansion Project

January 2012

U.S. Bureau of Land Management
Winnemucca District Office
Black Rock Field Office
5100 E. Winnemucca Blvd.
Winnemucca NV 89445-2921

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ABBREVIATIONS AND ACRONYMS

Reader Note: Refer to the list below for abbreviations or acronyms that may be used in this document.

<	less than
≤	less than or equal to
>	greater than
°	degrees
µg/m^3	micrograms per cubic meters
AADT	annual average daily traffic
AAQS	Ambient Air Quality Standards
ABA	acid base accounting
ACE	U.S. Army Corps of Engineers
ADT	average daily traffic
afa	acre feet annually
AHPA	Archaeological and Historic Preservation Act of 1974
AIRFA	American Indian Religious Freedom Act of 1978
AML	Appropriate Management Levels
amsl	above mean sea level
ANFO	ammonium nitrate/fuel oil mixture
ANSI	American National Standards Institute
AP	Advanced Placement
APE	Area of Potential Effect
AQMA	Air Quality Management Area
ARD	acid rock drainage
ARPA	Archaeological Resource Protection Act of 1979
ASW	Applied Soil and Water Technologies
AUM	animal unit month
B&K	Bruel & Kjaer (microphones)
BAPC	Bureau of Air Pollution Control
BAQP	Bureau of Air Quality Planning
BATF	Bureau of Alcohol, Tobacco, Firearms, and Explosive
BBA	Brown Buntin Associates, Inc.
BCR	Bird Conservation Region
BEA	Bureau of Economic Analysis
bgs	below ground surface
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMPs	Best Management Practices
BMRR	Bureau of Mining Regulation and Reclamation
BRFO	Black Rock Field Office
BSA	Barkdull Spencer Agency
C	Celsius
CAB	Community Advisory Boards
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act

CESA	cumulative effects study area
CFR	Code of Federal Regulations
cm/sec	centimeters per second
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
$CO_2(e)$	carbon dioxide equivalent
dB	decibels
dBA	decibel with A weighting filter
DE	diatomaceous earth
DETR	Department of Employment, Training, and Rehabilitation
DMV	Department of Motor Vehicles
DOI	Department of the Interior
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
ENM	Environmental Noise Model
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-To-Know Act
ESA	Endangered Species Act
ET	evapotranspiration
F	Fahrenheit
FCAA	Federal Clean Air Act
FCWA	Federal Clean Water Act
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FLPMA	Federal Land Policy and Management Act
FMCSA	Federal Motor Carrier Safety Administration
ft/day	feet per day
FTA	Federal Transit Administration
GBBO	Great Basin Bird Observatory
GED	General Educational Development
GHG	greenhouse gas
GID	General Improvement District
GIS	Geographic Information System
gpd	gallons per day
gpm	gallons per minute
gpm/ft^2	gallons per minute per square foot
GPS	global positioning system
H:V	horizontal to vertical
H_2S	hydrogen sulfide
HAP	Hazardous Air Pollutants
HCRMP	Humboldt County Regional Master Plan
HCSD	Humboldt County School District
HCSO	Humboldt County Sheriff's Office
HCT	humidity cell test
HDA	Humboldt Development Authority

HDPE	high density polyethylene
HGH	Humboldt General Hospital
HMA	Herd Management Areas
HRDI	Hycroft Resources and Development, Inc.
HSWA	Hazardous and Solid Waste Amendments
Hz	hertz
I-80	Interstate 80
ICC	International Code Council
ICP	induced coupled plasma
ID	Interdisciplinary
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
KMG	Kamma Mountains Group
KOP	key observation point
Ktons	kilotons
kV	kilovolt
KVA	kilovolt amperes
L_{50}	noise level median
LCRS	leak collection recovery system
L_{dn}	noise levels day/night
L_{eq}	noise level average
LFD	Lovelock Fire Department
L_{max}	noise level maximum
LMWD	Lovelock Meadows Water District
LPD	Lovelock Police Department
LR2000	Land and Mineral Legacy Rehost System
LRL	Lockwood Regional Landfill
MBTA	Migratory Bird Treaty Act
MDB&M	Mount Diablo Base & Meridian
MFP	Management Framework Plan
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
Mgal	million gallons
Mgd	million gallons per day
MMPA	Materials and Minerals Policy Act
MOU	Memorandum of Understanding
mph	miles per hour
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
mW/m^2	milliwatt per square meter
MWMP	Meteoric Water Mobility Procedure
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAD83	North American Datum 1983
NAG	net acid generation

NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAIP	National Agricultural Imagery Program
NCA	National Conservation Area
NDE	Nevada Department of Education
NDEP	Nevada Division of Environmental Protection
NDOA	Nevada Department of Agriculture
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDSP	Nevada Division of State Parks
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NESHAP	National Emission Standard for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NHPD	Nevada Highway Patrol Division
NNHP	Nevada Natural Heritage Program
NNPS	Nevada Native Plant Society
NO_2	nitrogen dioxide
NOI	Notice of Intent
Non-PAG	non-potentially acid generating
NO_X	oxides of nitrogen
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NSAAQS	Nevada State Ambient Air Quality Standards
NSHD	Nevada State Health Division
NSO	BLM Nevada State Office
NSPL	National System of Public Lands
NSPS	New Source Performance Standards
NVAAQS	Nevada Ambient Air Quality Standards
NVCRIS	Nevada Cultural Resources Information System
NV DOT	Nevada Department of Transportation
NVHC	Nevada Health Centers, Inc.
NWIS	National Water Information System
NWS	National Weather Service
O_3	ozone
OLSG	Old Lang Syne Group
opt	ounces per ton
OSHA	Occupational Safety and Health Administration
PASS	Personal Achievement School Success
PAG	potential acid generating
Pb	lead
PCMP	Pershing County Master Plan
PCPI	per capital personal income
PCRI	properties of cultural or religious importance
PCS	petroleum contaminated soils
PCSD	Pershing County School District

PCSO	Pershing County Sheriff's Office
PHREEQC	PH-REdox-EQuilibrium-Chemistry
Plan	Plan of Operations
PLS	pure live seed
PM_{10}	particulate matter with aerodynamic diameter less than 10 microns
$PM_{2.5}$	particulate matter with aerodynamic diameter less than 2.5 microns
PMU	population management unit
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PRIA	Public Rangelands Improvement Act of 1978
Project	Hycroft Mine Expansion Project
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
REMSA	Regional Emergency Medical Services Authority
RFFAs	reasonably foreseeable future actions
RMIS	Recreation Management Information System
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
RPC	Regional Planning Commission
RV	recreational vehicle
SARA	Superfund Amendments and Reauthorization Act
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SEA	Safe Explosives Act
SEM	scanning electron microscopy
SG	Sulphur Group
SHPO	State Historic Preservation Office
SLAMS	state and local air monitoring site
SO_2	sulfur dioxide
SR	State Route
SRA	State Recreation Area
SWPPP	Storm Water Pollution Prevention Plan
TCP	traditional cultural property
TDS	total dissolved solids
Title V	Federal Operating Permit Program
tpd	tons per day
tpy	tons per year
TRI	Toxics Release Inventory
TSCA	Toxic Substances Control Act
U.S.	United States
UBC	Uniform Building Code
USDC	United States Department of Commerce
UNR	University of Nevada Reno

UPRR	Union Pacific Railroad
USDA	United States Department of Agriculture
USDA-FS	United States Department of Agriculture- Forest Services
USDOT	United States Department of Transportation
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VFD	Volunteer Fire Department
VOC	volatile organic compounds
VRM	Visual Resource Management
WAD	weak acid dissolvable
WCDCD	Washoe County Department of Community Development
WCHD	Washoe County Health District
WCSD	Washoe County School District
WCSO	Washoe County Sheriff's Office
WEG	wind erodibility group
WPCP	Water Pollution Control Permit
WPD	Winnemucca Police Department
WRF	waste rock facility
WRFD	Winnemucca Rural Fire Department
WRMP	Waste Rock Management Plan
WWTF	Wastewater Treatment Facility
XRD	X-Ray diffraction

4 CUMULATIVE IMPACTS

4.1 Introduction

CEQ regulations for the NEPA define a cumulative impact as follows:

> "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individual minor but collectively significant actions taken place over a period of time" (40 CFR 1508.7).

As required under the NEPA and the regulations implementing the NEPA, this chapter addresses those cumulative effects on the environmental resources in the cumulative effect study areas (CESAs), which could result from the implementation of the Proposed Action and reasonable alternatives, past actions, present actions, and RFFAs. The extent of the CESA would vary with each resource, based on the geographical or biological limits of that resource. As a result, the list of projects considered under the cumulative analysis varies according to the resource being considered. In addition, the length of time for cumulative effects to occur would vary according to the duration of impacts from the Proposed Action on the particular resource.

For the purposes of this analysis and under federal regulations, "impacts" and "effects" are assumed to have the same meaning and are interchangeable. The cumulative impacts analysis was accomplished through four steps:

- Step 1: Identify, describe, and map CESAs for each resource to be evaluated in this chapter;

- Step 2: Define time frames, scenarios, and acreage estimates for cumulative impact analysis. Past and present disturbances and activities include commercial/public and mining operations within disturbed areas not reclaimed or unsatisfactorily reclaimed (impacts from those activities are reflected in the current condition). Future scenarios address reasonably foreseeable actions from the following: grazing and agriculture; utilities and infrastructure activities; wildfires; recreation activities; mining and exploration activities identified in notices and plans of operation; hazardous/solid waste activities; and oil, gas, and geothermal activities;

- Step 3: Identify and quantify (if possible) the location of possible specific impacts from the Proposed Action and judge the significance of these contributions to the overall impacts. The incremental impact of the Proposed Action is determined by calculating the sum or combination of all the past, present, and RFFAs (excluding the Proposed Action) and then determining the incremental increase from the Proposed Action (e.g., if all actions, excluding the Proposed Action, total 1,000 acres and the Proposed Action is ten acres, then the incremental contribution of the Proposed Action would be one percent); and

- Step 4: Evaluate the combined effects of the information and data identified within each CESA as it relates to the resources brought forward for cumulative impact analysis.

Information utilized in the cumulative impacts assessment was gathered from the following sources: the BLM; State of Nevada; local jurisdictions; private land owners; and mining companies. The past actions, present actions, and RFFAs are current as of September 2011. Changes in actions after this date are not considered in this analysis.

Environmental consequences of the Proposed Action and the reasonable alternatives were evaluated in Chapter 3 for the various environmental resources. Based upon the analysis of the environmental resources as completed in Chapter 3, the following resources could be impacted by the Proposed Action and reasonable alternatives: air quality; cultural resources; geology, minerals, and energy; recreation; social values and economics; soils; special status species; transportation infrastructure, access, and public safety; vegetation; visual resources; hazardous and solid wastes; water quality and quantity (surface and ground); and wildlife. The above resources are considered to have the potential to be cumulatively impacted by actions within the identified CESA for that resource.

4.2 Cumulative Effect Study Areas

The CESAs vary in size and shape to reflect each evaluated environmental resource. The geographical areas considered for the analysis of cumulative effects are generally illustrated in Figure 3.12.1, Figure 3.15.1, Figure 3.17.1, Figure 4.2.1, and Figure 4.2.2. Table 4.2-1 outlines the CESAs and their size, as well as references to the figures that show the described areas.

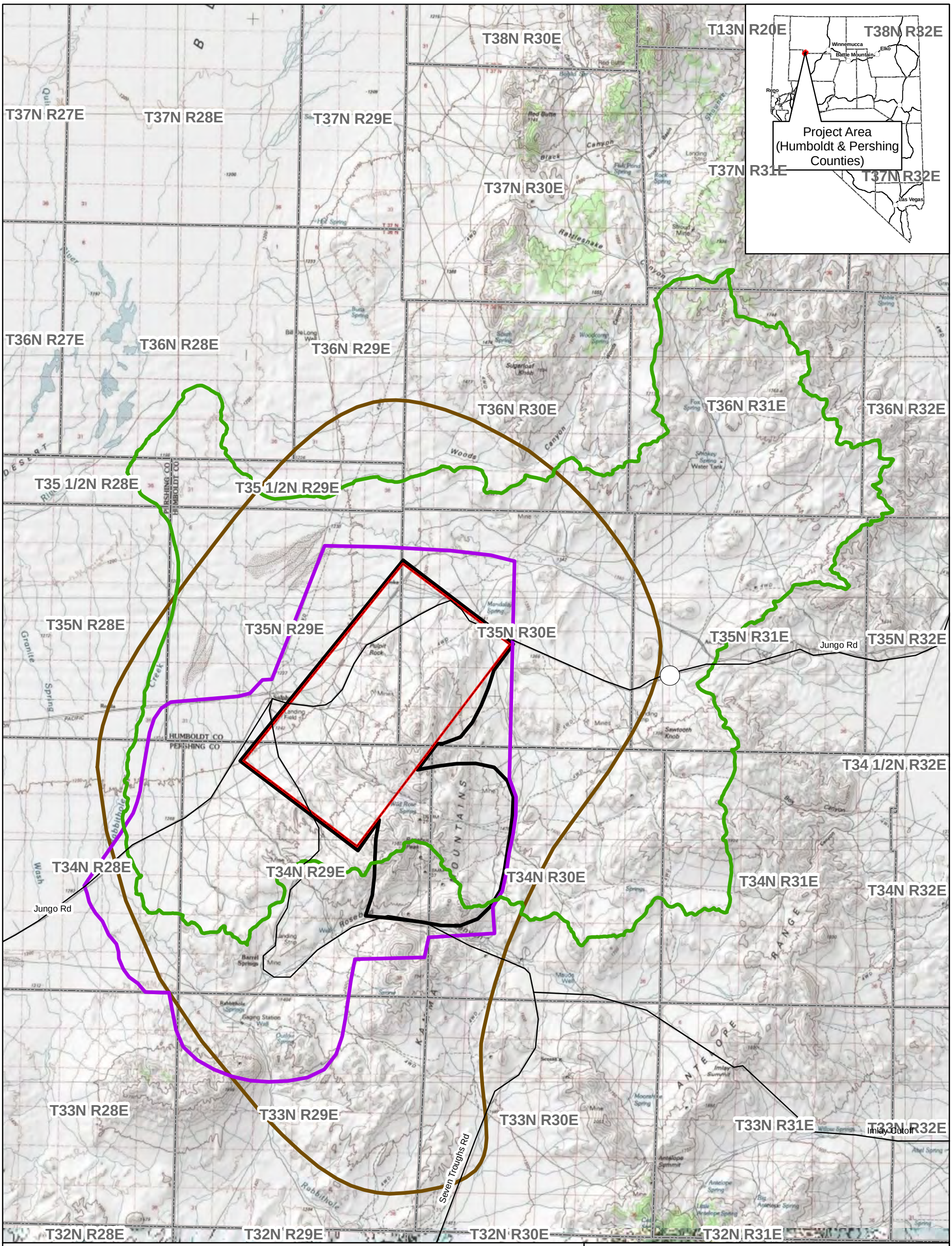
The CESA for air quality was determined to be a 50-kilometer radius around the center of the Project Area that was used to analyze the Proposed Action. The CESA includes 2,208,582 acres and is shown on Figure 4.2.2.

The CESA for cultural resources was determined to encompass the Project Area, the Sulphur, Rosebud, and Rabbit Hole mining districts, and a portion of the Black Rock Desert-High Rock Canyon Emigrant Trail NCA, which also includes a portion of the historic Applegate-Lassen Trail. This area encompasses major historic, pre-historic, and Native American areas of concern. The CESA includes 63,850 acres and is shown on Figures 3.3.1 and 4.2.1.

The CESA for geology, minerals, and energy encompasses the Project Area and follows the boundaries of the Rosebud and Rabbit Hole mining districts, which are the mining districts surrounding the Project Area that have similar geologic characteristics. The CESA includes 23,350 acres and is shown on Figure 4.2.1.

The Devil's Corral HUC 5 Watershed has been determined to be the CESA for the following resources: invasive, nonnative, and noxious weed species; migratory birds; soils; special status plant species; water quality and quantity (surface and ground); and wildlife. These resources would experience similar impacts within this local watershed for the Project Area. The CESA includes 124,903 acres and is shown on Figure 4.2.1.

The CESA for recreation is generally defined as the southern portion of the NCA and the northern and eastern boundary of the Devil's Corral HUC 5 Watershed, since a majority of the recreation activities that occur in the vicinity of the Project Area are located in this area. The CESA includes 576,596 acres and is shown on Figure 4.2.2.



Explanation

- Proposed Project Area Boundary
- Access Roads
- Cultural Resources CESA
- Geology CESA
- Special Status Wildlife CESA
- Watershed CESA

Projection: UTM Zone 11 North, NAD83

1:148,000

0 1.25 2.5 5 Miles

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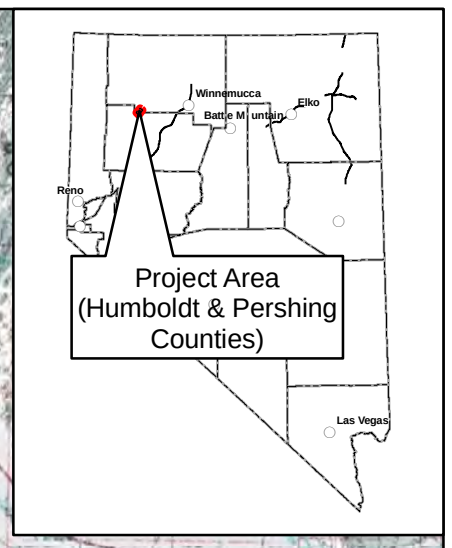
HYCROFT MINE EXPANSION PROJECT

Large Scale Cumulative Effects Study Areas Map

Figure 4.2.1

11/28/2011



HUMBOLDT

WASHOE

PERSHING

Jungo Rd

Jungo Rd

Imlay Cutoff

Seven Troughs Rd

447

80

Projection: UTM Zone 11 North, NAD83

Explanation

- Proposed Project Area Boundary
- Access Roads
- Vegetation CESA
- Recreation CESA
- Air Quality CESA

1:500,000

0 5 10 20 Miles

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Small Scale Cumulative Effects Study Areas Map

Figure 4.2.2

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The CESA for social values and economics includes all of Humboldt and Pershing Counties and Census Tract 35.01 of Washoe County and is based on the assumption that the majority of the social and economic effects of the Project would be concentrated in Winnemucca, Lovelock, and Gerlach. The CESA includes 13,373,721 acres and is shown on Figure 3.12.1.

The CESA for special status wildlife species is a four-mile radius around the Project Area plus a small area of the Majuba greater sage-grouse PMU. This area encompasses the existing and potential nesting habitat for golden eagle. The CESA includes 122,438 acres and is shown on Figure 4.2.1.

The CESA for transportation, access, and public safety, has been determined to be the Project Area plus Jungo Road east to Winnemucca. This area includes the portion of Jungo Road since most of the Project traffic travels this roadway, and hazardous and solid wastes would be transported on this segment of Jungo Road. The CESA includes 204 acres and is shown on Figure 3.15.1.

The CESA for vegetation has been determined to be the Black Rock Desert Hydrographic Basin, since any impacts to vegetation would be focused within the hydrographic basin. The CESA includes 1,389,498 acres and is shown on Figure 4.2.2.

The CESA for visual resources is the a 20-mile radius of the Project Area as represented by the viewshed and is based on the fact that it is the area where the Project effects could be viewed relative to cumulative activities. The viewshed contains approximately 328,678 acres and is shown on Figure 3.17.1.

Table 4.2-1: Cumulative Effects Study Areas by Resource

Resource	Cumulative Effects Study Area	CESA Name	Size of Area (acres)	Figure Number Reference
Air and Atmospheric Resources	50-km radius around Hycroft fence	Air Quality CESA	2,208,582	4.2.2
Cultural Resources	Generally described as an area encompassing the Project Area, the Sulphur, Rosebud, and Rabbit Hole mining districts, as well as a portion of the Black Rock Desert-High Rock Canyon Emigrant Trail NCA	Cultural Resources CESA	63,850	4.2.1
Geology, Minerals, and Energy	Area including Project Area, Sulphur and Rosebud mining districts	Geology CESA	23,350	4.2.1
Migratory Birds	Devil's Corral HUC 5 Watershed	Watershed CESA	124,903	4.2.1
Recreation	Generally defined as the southern portion of the NCA and the northern and eastern boundary of the Devil's Corral HUC 5 Watershed	Recreation CESA	576,596	4.2.2
Social Values and Economics	Humboldt County, Pershing County, and Census Tract 35.01 of Washoe County	Social Values and Economics CESA	13,373,721	3.12.1

Resource	Cumulative Effects Study Area	CESA Name	Size of Area (acres)	Figure Number Reference
Soils	Devil's Corral HUC 5 Watershed	Watershed CESA	124,903	4.2.1
Special Status Species	Four-mile radius around Project Area and portion of sage-grouse PMU (wildlife); Devil's Corral HUC 5 Watershed (plants)	Special Status Wildlife CESA/ Watershed CESA	122,438/ 124,903	4.2.1
Transportation, Access, and Public Safety	Project Area plus Jungo Road east to Winnemucca	Transportation CESA	204	3.15.1
Vegetation	Black Rock Desert Hydrographic Basin	Vegetation CESA	1,389,498	4.2.2
Visual Resources	20-mile viewshed of the Project	Visual Resources CESA	328,678	3.17.1
Water Quality and Quantity (Surface and Ground)	Devil's Corral HUC 5 Watershed	Watershed CESA	124,903	4.2.1
Wildlife	Devil's Corral HUC 5 Watershed	Watershed CESA	124,903	4.2.1

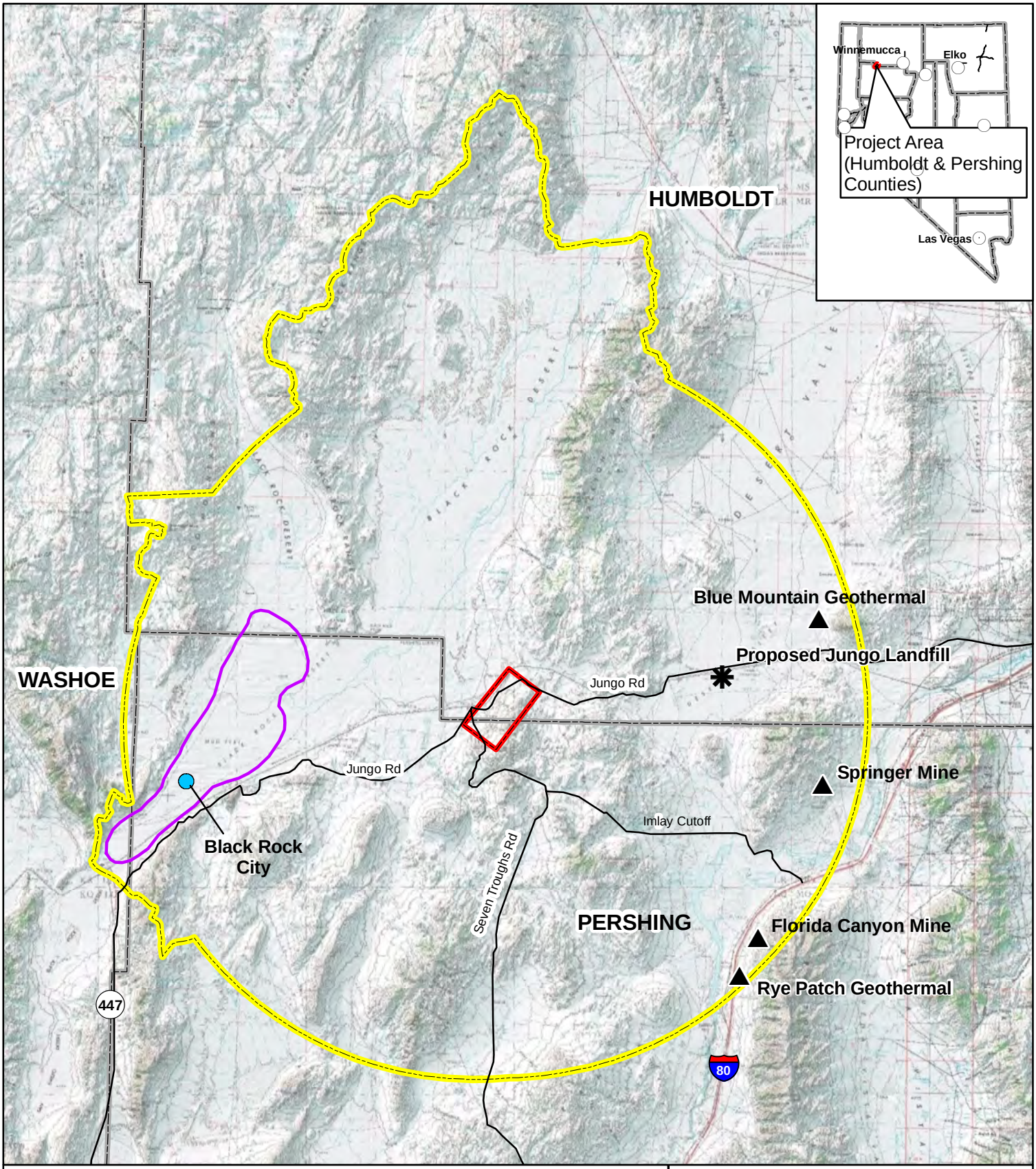
A cumulative data collection area was established that represents the maximum area of the CESAs combined for resources that have the potential to be affected by quantifiable surface disturbance and resource development activities. Therefore, this area excludes the visual resources CESA, the Social Values and Economics CESA, and the Transportation CESA as these resources. The cumulative data collection area is shown in Figure 4.2.3.

The cumulative impacts analysis for this EIS utilizes a time frame based on the estimated potential future duration of the impacts from the Proposed Action. Based on a Project approval in 2012 and a 12-year mining life, three additional years for milling, and five additional years for reclamation and closure, the time frames over which the cumulative analysis was completed are as follows:

- Geology and minerals and cultural resources - length of the mining portion of the Project; approximately 12 years (through 2024); and

- Air quality, visual resources, soils, vegetation resources, recreation, social and economic values, wildlife, hazardous materials, transportation and access - length of the Project, including reclamation; approximately 20 years (through 2032).

The types of Project-specific impacts to the resources evaluated in Chapter 3 may also occur as a result of the past actions, other present actions, and RFFAs. The potential cumulative effects from the past actions, present actions, and RFFAs are discussed in Section 4.4. The individual projects described in Section 4.3 comprise the past and present actions, and RFFAs identified by the BLM's BRFO and Land and Mineral Legacy Rehost System (LR2000) (BLM 2011b). RFFAs are those actions likely to occur within the timeframe of the Proposed Action.



Explanation

- Proposed Project Area Boundary
- Access Roads
- Cumulative Effects Data Collection Area
- Playa
- Black Rock City
- Other Existing Facilities
- Proposed Jungo Landfill

Projection: UTM Zone 11 North, NAD83

1:750,000

0 2.5 5 10 Miles

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Cumulative Effects Data Collection Area

Figure 4.2.3

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The projects and activities include the following: grazing and agriculture; utilities and distribution; recreation; land development; mineral development and exploration; hazardous and solid waste; and geothermal leasing. All of the projects and activities have the potential to impact the environmental resources of concern within all or portions of the various CESAs.

Table 4.2-2 outlines all of the actions considered in the cumulative impact analysis, their status, potential environmental impacts, and the area of the potential impact. An explanation of the abbreviations and numbering is located at the end of the table. Table 4.2-3 outlines the acres of surface disturbance associated with each of the actions considered in the cumulative effects data collection area. The acreage values in Table 4.2-3 are totaled under each category. Table 4.2-4 outlines the past and present activities and disturbance associated with each project type within each CESA. Table 4.2-5 outlines the RFFA activities and disturbance associated with each project type within each CESA.

Table 4.2-2: Summary of Activities that May Cumulatively Affect Resources

Project Description	Status	Anticipated Resources that Could Be Cumulatively Impacted	Primary/Secondary Impact Location
Grazing and Agriculture			
Irrigation Facilities	PP	1, 5	A, R
Irrigated Crops	PP	9	V
Range Improvements (catchments, cattle guards, corrals, springs, earth tanks, gates, reservoirs, troughs, wells, and windmills)	PP	1-11	A, C, G, H5, R, V, W
Fenced Operations and Pipelines	PP	1, 2, 4-11	A, C, H5, R, V, W
Utilities and Infrastructure			
Roads	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Highways	PP	1,9	A, V
Railroads	PP	1-11	A, C, G, H5, PA, R, V, W
Communication Sites	PP	1-11	A, C, G, H5, PA, R, V, W
Telephone	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Power line	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Water Facilities	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Wind Generation	PP	1, 9	A, V
Oil and Gas Pipelines	PP, RF	1	A
Other	PP, RF	1, 5, 9	A, R, V
Wildland Fires			
Wildland Fires (1981-2008)	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Recreation			
Black Rock Hot Springs	PP, RF	1, 5	A, R
Black Rock Playa	PP, RF	1, 5, 9	A, R, V
Clapper Canyon Historical Site	PP, RF	1	A
Double Hot Springs	PP, RF	1, 5	A, R
Hardin City	PP, RF	1, 5	A, R
Trego Hot Springs	PP, RF	1, 5, 9	A, R, V
Whiskey Hot Springs	PP, RF	1, 5	A, R
Dispersed Recreation	PP, RF	1-11	A, C, G, H5, R, V, W
Black Rock City (Burning Man)	PP, RF	1, 5, 9	A, R, V

Project Description	Status	Anticipated Resources that Could Be Cumulatively Impacted	Primary/Secondary Impact Location
Land Development			
Land Sales	PP, RF	1, 9	A, V
Gerlach	PP, RF	9	V
Imlay	PP, RF	1	A
Mineral Development and Exploration			
Mining and Exploration Plans of Operation (20)	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Exploration Notices (487)	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Sand and Gravel Extraction Operations (118)	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Hazardous/Solid Waste and Hazardous Materials			
Jungo Landfill	RF	1	A
Geothermal Leasing			
Geothermal Leases (20)	PP, RF	1-11	A, C, G, H5, PA, R, V, W
Geothermal Utilization Site	PP	1	A
Blue Mountain Geothermal Project	PP	1	A
Rye Patch Geothermal	PP, RF	1	A
Source of Information:	Status: PP – Past and Present Actions RF – Reasonably Foreseeable Actions	Issues: 1. Air and Atmospheric Resources 2. Cultural Resources/Native American Religious Concerns 3. Geology, Minerals, and Energy 4. Migratory Birds 5. Recreation 6. Soils 7. Special Status Plants 8. Special Status Wildlife 9. Vegetation 10. Water Quality and Quantity (Surface and Ground) 11. Wildlife	Location: A = Air Quality CESA C = Cultural Resources CESA G = Geology CESA H5 = Watershed CESA PA = Project Area R = Recreation CESA V = Vegetation CESA W = Special Status Wildlife CESA

Table 4.2-3: Surface Disturbance or Area Associated with Projects within the Cumulative Effects Data Collection Area

Project Description	Past and Present (acres)	RFFA (acres)	Total (acres)
Grazing and Agriculture			
Irrigation Facilities	5,454	0	5,454
Irrigated Crops	2,921	0	2,921

Project Description	Past and Present (acres)	RFFA (acres)	Total (acres)
Range Improvements (catchments, cattle guards, corrals, springs, earth tanks, gates, reservoirs, troughs, wells, and windmills)	nq	nq	nq
Fenced Feeding Operations and Pipelines	nq	nq	nq
Utilities and Infrastructure			
Roads	13,270	90	13,360
Highways	670	0	670
Railroads	179	0	179
Communication Sites	41	0	41
Telephone	2,254	1	2,255
Power line	2,910	2	2,912
Water Facilities	300	14	314
Wind Generation	9,256	0	9,256
Oil and Gas Pipelines	919	1	920
Other	27	2	29
Wildland Fires			
Wildland Fires (1981-2008)	334,371	0	334,371
Recreation			
Black Rock Hot Springs	nq	0	nq
Black Rock Playa	85,446	0	85,446
Clapper Canyon Historical Site	37	0	37
Double Hot Springs	127	0	127
Hardin City	40	0	40
Trego Hot Springs	nq	0	nq
Whiskey Hot Springs	nq	0	nq
Dispersed Recreation	nq	nq	nq
Black Rock City (Burning Man)	4,400	nq	4,400
Land Development			
Land Sales	67,029	550	67,579
Gerlach	320	0	320
Imlay	91	0	91
Mineral Development and Exploration			
Mining and Exploration Plans of Operation (18)	13,587	15	13,602
Exploration Notices (417)	718	8	726
Sand and Gravel Extraction Operations (118)	2,471	198	2,669
Hazardous/Solid Waste and Hazardous Materials			
Jungo Landfill	0	560	560
Geothermal Leasing			
Geothermal Leases	nq	nq	nq
Geothermal Utilization Site	13	0	13
Blue Mountain Geothermal Project	71	0	71
Rye Patch Geothermal	nq	nq	nq

Notes: nq = not quantified or quantifiable

Table 4.2-4: Surface Disturbance or Area Associated with Past and Present Projects within Each Cumulative Effects Study Area

Project Description	Past and Present (acres)						
	A	C	G	H5	R	V	W
Grazing and Agriculture							
Irrigation Facilities	5,454	0	0	0	151	0	0
Irrigated Crops	nq	nq	nq	0	nq	2,921	nq
Range Improvements	nq	nq	nq	nq	nq	nq	nq
Fenced Feeding Operations and Pipelines	nq	nq	nq	nq	nq	nq	nq
Utilities and Infrastructure							
Roads	12,504	nq	nq	766	nq	nq	nq
Highways	558	nq	nq	92	nq	nq	nq
Railroads	150	nq	nq	29	nq	nq	nq
Communication Sites	36	19	19	19	19	29	19
Telephone	2,216	780	780	780	906	1,900	780
Power line	1,900	610	610	610	616	1,609	610
Water Facilities	246	40	40	40	40	142	40
Wind Generation	4,327	0	0	0	0	4,929	0
Oil and Gas Pipelines	919	0	0	0	0	0	0
Other	1	0	0	0	0	26	0
Wildland Fires							
Wildland Fires (1997-2007)	365,228	2,887	2,593	2,831	3,743	53,878	2,890
Recreation							
Black Rock Hot Springs	nq	nq	nq	nq	nq	nq	nq
Black Rock Playa	85,446	0	0	0	85,446	85,446	0
Clapper Canyon Historical Site	37	0	0	0	0	0	0
Double Hot Springs	127	0	0	0	127	0	0
Hardin City	40	0	0	0	40	0	0
Trego Hot Springs	nq	nq	nq	nq	nq	nq	nq
Whiskey Hot Springs	nq	nq	nq	nq	nq	nq	nq
Dispersed Recreation	nq	nq	nq	nq	nq	nq	nq
Black Rock City (Burning Man)	4,400	0	0	0	4,400	4,400	0
Land Development							
Land Sales	62,524	0	0	0	0	60,319	0
Gerlach	0	0	0	0	0	320	0
Imlay	91	0	0	0	0	0	0
Mineral Development and Exploration							
Mining and Exploration Plans of Operation	13,571 (13)	7,940 (6)	7,940 (6)	7,927 (5)	7,940 (6)	7,955 (9)	7,940 (6)
Exploration Notices	583 (332)	93 (57)	72 (44)	77 (46)	194 (117)	378 (229)	167 (100)
Sand and Gravel Extraction Operations	1,934 (86)	17 (4)	17 (4)	12 (3)	167 (20)	629 (44)	17 (4)
Hazardous/Solid Waste and Hazardous Materials							
Jungo Landfill	0	0	0	0	0	0	0
Geothermal Leasing							
Geothermal Leases	nq	nq	nq	nq	nq	nq	nq
Geothermal Utilization Site	13	0	0	0	0	0	0

Project Description	Past and Present (acres)						
	A	C	G	H5	R	V	W
Blue Mountain Geothermal Project	71	0	0	0	0	0	0
Rye Patch Geothermal	nq	0	0	0	0	0	0

Notes: A = Air Quality CESA; C = Cultural Resources CESA; G = Geology CESA; H5 = Watershed CESA; R = Recreation CESA; V = Vegetation CESA; W = Special Status Wildlife CESA

Table 4.2-5: Surface Disturbance or Area Associated with Reasonably Foreseeable Future Actions within Each Cumulative Effects Study Area

Project Description	RFFA (acres)						
	A	C	G	H5	R	V	W
Grazing and Agriculture							
Irrigation Facilities	0	0	0	0	0	0	0
Irrigated Crops	nq	nq	nq	nq	nq	nq	nq
Range Improvements	nq	nq	nq	nq	nq	nq	nq
Fenced Feeding Operations and Pipelines	nq	nq	nq	nq	nq	nq	nq
Utilities and Infrastructure							
Roads							
Highways	0	0	0	0	0	90	0
Railroads	0	0	0	0	0	0	0
Communication Sites	0	0	0	0	0	0	0
Telephone	0	0	0	0	0	0	0
Power Line	1	0	0	0	0	0	0
Water Facilities	2	0	0	0	0	0	0
Wind Generation	14	0	0	0	0	0	0
Oil and Gas Pipelines	0	0	0	0	0	0	0
Other	1	0	0	0	0	0	0
Wildland Fires							
Wildland Fires (1997-2007)	nq	nq	nq	nq	nq	nq	nq
Recreation							
Black Rock Hot Springs	nq	nq	nq	nq	nq	nq	nq
Black Rock Playa	0	0	0	0	0	0	0
Clapper Canyon Historical Site	0	0	0	0	0	0	0
Double Hot Springs	0	0	0	0	0	0	0
Hardin City	0	0	0	0	0	0	0
Trego Hot Springs	nq	nq	nq	nq	nq	nq	nq
Whiskey Hot Springs	nq	nq	nq	nq	nq	nq	nq
Dispersed Recreation	nq	nq	nq	nq	nq	nq	nq
Black Rock City (Burning Man)	4,400	0	0	0	4,400	4,400	0
Land Development							
Land Sales	3,971	0	0	0	0	961	0
Gerlach	0	0	0	0	0	0	0
Imlay	0	0	0	0	0	0	0
Mineral Development and Exploration							
Mining and Exploration Plans of Operation	8 (1)	0	0	0	0	7 (1)	0
Exploration Notices	7 (5)	1 (1)	0	2 (2)	3 (3)	4 (4)	2 (2)

Project Description	RFFA (acres)						
	A	C	G	H5	R	V	W
Sand and Gravel Extraction Operations	198 (10)	48 (1)	48 (1)	48 (1)	48 (1)	61 (3)	48 (1)
Hazardous/Solid Waste and Hazardous Materials							
Jungo Landfill	560	0	0	0	0	0	0
Geothermal Leasing							
Geothermal Leases	nq	nq	nq	nq	nq	nq	nq
Geothermal Utilization Site	0	0	0	0	0	0	0
Blue Mountain Geothermal Project	0	0	0	0	0	0	0
Rye Patch Geothermal	nq	0	0	0	0	0	0

Notes: A = Air Quality CESA; C = Cultural Resources CESA; G = Geology CESA; H5 = Watershed CESA; R = Recreation CESA; V = Vegetation CESA; W = Special Status Wildlife CESA

4.3 Past, Present, and Reasonably Foreseeable Future Actions

4.3.1 Grazing and Rangeland Improvements

4.3.1.1 Past and Present Actions

Livestock grazing has been and continues to be a dominant land use in Humboldt and Pershing Counties. Multiple grazing allotments have been permitted and administered by the BLM over approximately the past half century. There are currently 27 grazing allotments located within all or portions of the CESAs.

Grazing and rangeland improvements within the CESAs include the following: catchment basins; cattle guards; corrals; developed springs; earth tanks; gates; reservoirs; troughs; wells; windmills; allotment fences; exclosures; fences; pipelines; and private fences. Table 4.3-1 shows the number and length of rangeland improvement types within each CESA.

Surface water sources that support livestock grazing and agriculture within the CESAs include perennial creeks, springs, and seeps. Improved water sources include developed springs, stock wells, stock ponds, water pipelines, and troughs. Livestock would generally congregate near these features. Existing livestock water use (stock water) includes 107.53 afa in the Black Rock Desert Hydrographic Basin. In addition, a substantial amount of four-strand (three barbed and one smooth wire on the bottom) wire fencing has been constructed within the CESAs. Surface disturbance and changes to the vegetation community have occurred as a result of past and present livestock use.

Existing (active or recently active) agricultural development in the Black Rock Desert Hydrographic Basin (Vegetation CESA) identified approximately 2,921 acres of development using 2010 National Agricultural Imagery Program (NAIP) imagery (USDA 2010). No existing agricultural development was observed within the Devil's Corral HUC 5 Watershed (Watershed CESA). Quantification of current water rights for irrigation from underground sources (current as of September 2011) used NDWR data to identify approximately 17,122 afy from underground sources.

Table 4.3-1: Rangeland Improvements Located within Each CESA

CESA	Rangeland Improvement Type
Air Quality CESA	Catchments (4); cattle guards (8); corrals (4); developed springs (37); exclosure (1); gates (2); reservoirs (11); troughs (36); wells 12); windmills (11); allotment fences (152 miles); exclosures (6.6 miles); fences (79.5 miles); pipelines (24 miles); private fences (153 miles)
Cultural Resources CESA	Corral (1); developed springs (2); allotment fence (25 miles); fences (12 miles)
Geology CESA	Developed spring (1); allotment fence (25 miles); fence (7 miles)
Watershed CESA	Corral (1); developed spring (1); well (1); allotment fences (35 miles); fences (12 miles)
Recreation CESA	Catchment (1); cattle guard (1); corrals (3); developed springs (13); gates (4); guzzler (1); reservoirs (4); troughs (10); well (1); miscellaneous (1); allotment fences (61 miles); exclosures (4 miles); fences (27 miles); pipelines (8.5 miles); private fences (46.5 miles)
Special Status Wildlife CESA	Corral (1); developed springs (2); well (1); allotment fences (35 miles); fences (12 miles)
Vegetation CESA	Catchments (5); cattle guards (8); corrals (15); developed springs (29); exclosure (1); reservoirs (21); troughs (26); wells (20); windmills (5); allotment fences (85 miles); exclosures (8 miles); fences (56 miles); pipelines (11 miles); private fences (52 miles)

4.3.1.2 Reasonably Foreseeable Future Actions

Livestock grazing is expected to continue at management levels established in the various grazing allotments including the vicinity of the Proposed Action. There are currently no projects proposed as part of ongoing livestock management programs at the BLM BRFO within the cumulative effects data collection area.

4.3.2 Utilities and Infrastructure

4.3.2.1 Past and Present Actions

Past and present utility and distribution actions include the development of roads, highways, railroads, power lines, communication sites; telephone lines and facilities; water facilities; wind generation facilities; and other types of utilities and infrastructure.

Utilities and infrastructure within the CESAs include the following: roads and highways; railroads; communication sites; telephone lines and facilities; power lines; water facilities; wind generation facilities; oil and gas pipelines; and other types of utilities and infrastructure. Table 4.2-4 summarizes the number of acres of each utility and infrastructure type within each CESA.

Three general types of roads have been developed within Humboldt, Pershing, and adjoining portions of Washoe County: paved roads, gravel surface roads, and dirt roads. Based on aerial photo review available from 2010 NAIP imagery (USDA 2010) and the Pershing and Humboldt County Road databases, there are approximately 2,694 miles of roads within the Air Quality CESA (70 miles of I-80; 85 of miles state highways; 2,004 miles of local, neighborhood, and rural roads; 556 miles of dirt roads). There are approximately 178 miles of roads within the Watershed CESA (19 miles of I-80; 81 miles of local, neighborhood, and rural roads; 77 miles of

dirt roads). In addition, undocumented dirt roads are present on public and private lands located within the CESAs that may account for surface disturbance and habitat fragmentation.

4.3.2.2 Reasonably Foreseeable Future Actions

Development of additional roads is reasonable to anticipate; however, these roads are likely to be dirt roads created by recreational use of the public lands in the CESAs. According to the LR2000 database, there are 90 acres of pending road ROWs within the Vegetation CESA and approximately four acres of other utilities and infrastructure pending ROWs.

It is reasonable to expect that traffic would increase in volume on the major travel routes in the CESAs, as well as on the other county roads in proportion to an expected increase in economic activity and population growth.

There is one pending wind generation ROW affecting approximately 14 acres that is present within the Air Quality CESA.

4.3.3 Land Development

4.3.3.1 Past and Present Actions

The Town of Gerlach is comprised of approximately 320 acres and is located only within the Vegetation CESA. The Town of Imlay is comprised of approximately 91 acres and is located only within the Air Quality CESA. These towns consist of roads, residences, commercial and public buildings, power lines, fences, and other related development. Within all the CESAs there are remote private rural residential developments (ranches).

According to the LR2000 database, there were 62,524 acres of existing land sales that occurred within the Air Quality CESA and 60,319 acres of land sales that occurred in the Vegetation CESA. There were no additional land sales listed in any of the other CESAs.

4.3.3.2 Reasonably Foreseeable Future Actions

Future expansion of Gerlach and Imlay are considered possible under RFFAs. Future public land sales are considered possible under RFFAs. There are a total of 3,971 acres of land sales anticipated to occur in the Air Quality CESA. There are a total of 961 acres of land sales anticipated to occur in the Vegetation CESA. Public lands converted to private ownership would be subject to all applicable state environmental laws. If a land sale involved community development land, there would likely be a future change in use from native vegetation to residential and commercial development. If a land sale involved a resource development project, current resource activities would likely continue into the future with possible expansion. Long-term use of the land after the resource activity has been completed may be an activity or use other than livestock grazing and production and wildlife habitat, which would be the use if the land remained under BLM management. Long-term use of privatized land would be subject to any covenants agreed to at the time of sale.

4.3.4 Mineral Development and Exploration

4.3.4.1 Past and Present Actions

The Sulphur Mining District is located in Humboldt County, Nevada, in the northwestern part of the Kamma Mountains. Sulfur was discovered in this area around 1870, and was first mined in 1874. Four types of ore have been discovered in this area: high-grade silver ore; sulfur-mercury ore; alunite ore; and low-grade gold ore (NBMG 2011). The Rosebud Mining District is located in north-central Pershing County, Nevada, about halfway between Gerlach and Winnemucca. Gold was discovered around 1870 in this district. In addition to gold, silver, copper, and lead have also been discovered in the district (NBMG 2011).

Past and present mineral development and exploration actions within the CESAs include the following: mining and exploration plans of operation; exploration notices; and sand and gravel extraction operations. Quantification of water rights from underground sources, and used for mining and milling purposes, was identified as 4,508 afy using NDWR data (current as of September 2011). Table 4.3-2 shows the number of acres of mineral development and exploration disturbance in each CESA as reported in the LR2000 database.

The Springer Tungston Mine and the Florida Canyon Mine are located within the Air Quality CESA as shown on Figure 4.2.3. The Springer Mine is also located in Pershing County, Nevada, approximately 28 miles southwest of Winnemucca. The Springer facility includes a mine and mill capable of producing approximately 1,000 tons per day of tungsten. The mine activities were suspended in September 2008 pending improvement in the global financial markets, but have been recently re-commissioned (EMC 2011). The Florida Canyon Mine is located in Pershing County, Nevada, approximately 42 miles southwest of Winnemucca and is an open pit mine that has produced 3.3 million ounces of gold over the last 25 years. Mining activities at this mine have recently been terminated, but plans are underway for a leach pad expansion which would restart mining operations. Gold recovery from previously mined ore is still ongoing (Jipangu Inc. 2011).

Table 4.3-2: Mineral Development and Exploration Disturbance within Each CESA

CESA	Authorization Status	Total Acres of Disturbance
Air Quality	Authorized Notices (14)	39
	Closed Notices (318)	544
	Authorized Plans (3)	13,276
	Closed Plans (10)	295
	Air Quality CESA Total	**14,154**
Cultural Resources	Authorized Notices (3)	12
	Closed Notices (54)	81
	Authorized Plans (1)	7,700
	Closed Plans (5)	240
	Cultural Resources CESA Total	**8,033**
Geology	Authorized Notices (3)	12
	Closed Notices (41)	60
	Authorized Plans (1)	7,700
	Closed Plans (5)	240
	Geology CESA Total	**8,012**

CESA	Authorization Status	Total Acres of Disturbance
Watershed	Authorized Notices (5)	17
	Closed Notices (41)	60
	Authorized Plans (1)	7,700
	Closed Plans (4)	227
	Watershed CESA Total	**8,004**
Recreation	Authorized Notices (6)	20
	Closed Notices (111)	174
	Authorized Plans (1)	7,700
	Closed Plans (5)	240
	Recreation CESA Total	**8,134**
Special Status Wildlife	Authorized Notices (5)	18
	Closed Notices (95)	149
	Authorized Plans (1)	7,700
	Closed Plans (5)	240
	Special Status Wildlife CESA Total	**8,107**
Vegetation	Authorized Notices (10)	32
	Closed Notices (219)	346
	Authorized Plans (1)	7,700
	Closed Plans (8)	255
	Vegetation CESA Total	**8,333**

4.3.4.2 Reasonably Foreseeable Future Actions

There are RFFAs with mineral development and exploration activities within each CESA. Table 4.3-3 shows the number of foreseeable acres of mineral development and exploration activities within each CESA per the pending approvals listed in LR2000. Outside of the Proposed Action, there are no additional plans for mining within the Project Area.

Table 4.3-3: Mineral Development and Exploration RFFAs within Each CESA

CESA	Mineral Development and Exploration Disturbance (acres)
Air Quality CESA	Mining and Exploration Plans of Operation (8); Exploration Notices (7); Sand and Gravel Extraction Operations (198)
Cultural Resources CESA	Exploration Notices (1); Sand and Gravel Extraction Operations (48)
Geology CESA	Sand and Gravel Extraction Operations (48)
Watershed CESA	Exploration Notices (4); Sand and Gravel Extraction Operations (48)
Recreation CESA	Exploration Notices (3); Sand and Gravel Extraction Operations (48)
Special Status Wildlife CESA	Exploration Notices (2); Sand and Gravel Extraction Operations (48)
Vegetation CESA	Mining and Exploration Plans of Operation (7); Exploration Notices (4); Sand and Gravel Extraction Operations (61)

4.3.5 Geothermal Leasing and Development

4.3.5.1 Past and Present Actions -

There are 20 geothermal leases within the CESAs, for a total of approximately 29,025 acres. Leases are not considered surface disturbance, so quantifying them by CESA is not necessary.

The Blue Mountain Geothermal Facility is located in the Air Quality CESA and has a development footprint of approximately 71 acres (Figure 4.2.3). The Rye Patch Geothermal Facility is also located in the Air Quality CESA and although it has been constructed it is not currently operating; however, exploratory drilling for geothermal resources is currently underway (Figure 4.2.3).

4.3.5.2 Reasonably Foreseeable Future Actions

There are no identified RFFAs for geothermal leasing and development in any of the CESAs.

4.3.6 Hazardous/Solid Waste and Hazardous Materials

4.3.6.1 Past and Present Actions

Past uses of hazardous materials within the CESAs include fuels and other petroleum products associated with the mining and exploration activities and used to maintain and operate the mining and exploration equipment and vehicles. Vehicles using the various roads within the CESAs contain petroleum products. Maintenance of I-80 by the NDOT has included the annual application of herbicides within the highway ROW to minimize vegetation. It is likely that some petroleum products have been spilled as the result of vehicle accidents within the CESAs; however, the amounts are not readily quantifiable. Jungo Road has been used in the past to transport hazardous materials, including petroleum, to nearby mining operations, towns, and ranches.

4.3.6.2 Reasonably Foreseeable Future Actions

The proposed Jungo Landfill would be located along Jungo Road within the Air Quality CESA (Figure 4.2.3). The landfill is proposed to encompass approximately 560 acres and would be considered a Class I landfill. There is no anticipated date for the opening of the landfill.

4.3.7 Recreation

4.3.7.1 Past and Present Actions

Dispersed recreation occurs within each CESA. In addition, there are specific recreational sites that draw annual visitors. Table 3.11-2 in the Recreation section of this EIS lists the annual visitors to each of the listed recreation areas within the Black Rock-High Rock Emigrant Trails NCA.

4.3.7.2 Reasonably Foreseeable Future Actions

Recreational use within the CESAs is expected to continue consistent with past and present use, with dispersed outdoor recreational activities being the predominant type of recreation. In addition, the BLM is currently reviewing a five-year permit renewal proposal for the Burning Man Event, which is held annually in the Black Rock Desert.

4.3.8 Wildland Fires

4.3.8.1 Past and Present Actions

The three largest recorded fires in the cumulative data collection area include the following: the 2006 Sage Fire measured approximately 27,052 acres and falls within all or portions of the Air Quality CESA; the 2007 Tungsten Fire measured approximately 50,939 acres and falls within all or portions of the Air Quality CESA; and an unnamed fire that occurred in 1999 measured approximately 193,861 acres and falls within all or portions of the Vegetation CESA and the Air Quality CESA. Table 4.3-4 identifies the number of acres burned within each CESA between 1981 and 2008.

Table 4.3-4: Wildland Fires within Each CESA

CESA	Wildland Fires (acres)
Air Quality CESA	365,228
Cultural Resources CESA	2,887
Geology CESA	2,593
Watershed CESA	2,831
Recreation CESA	3,743
Special Status Wildlife CESA	2,890
Vegetation CESA	53,878

4.3.8.2 Reasonably Foreseeable Future Actions

Fire suppression activities are expected to continue to occur in the CESAs, as wildland fires are also expected to occur, and are likely to include areas previously burned and seeded.

4.4 Cumulative Impacts for the Proposed Action

This section presents descriptions of the collective or additive impacts of combining past, present, and RFFAs associated with mineral development and other land uses. Past, present, and reasonably foreseeable future land uses and human caused and natural occurrences are described in Section 4.3. Potential cumulative effects for air quality is based on predictive modeling results (air quality) and surface disturbing and emission sources as described below. The proposed surface disturbance from the Proposed Action (2,172 acres) relates to cumulative impacts for the following resources: Cultural Resources; Migratory Birds, Soils, Special Status Species, Vegetation, Visual Resources, Surface Water Resources, and Wildlife. The cumulative impacts not related to surface disturbance but rather the qualitative impacts of the Proposed Action are discussed for the following resources: Geology, Minerals, and Energy; Recreation; Social Values and Economics; Transportation, Access, and Public Safety; Ground Water Quality and Quantity. Elements or resources analyzed in Chapter 3 and determined to have no measurable impacts from the Proposed Action or No Action Alternative were not carried forward into this Chapter for analysis and include the following: Native American Religious Concerns; Noise; Wastes (Hazardous and Solid) and Realty. Criteria for evaluating impacts to the resources are the same as those presented in Chapter 3.

4.4.1 Air and Atmospheric Resources

The CESA for Air and Atmospheric Resources is the Air Quality CESA, which includes a 50-kilometer radius around the modeling fenceline and consists of 2,208,582 acres.

Past and Present Actions: Prior to the implementation of the FCAA, few if any measures to control or minimize impacts to air quality were required. Most mining operations were of smaller scale and consisted of underground operations with small disturbance footprints. Most air quality impacts from these operations consisted of the generation of fugitive dust during exploration road building, trenching, and mining operations, as well as agricultural operations and travel on dirt roads. Present actions within the Air Quality CESA that are likely to be contributing to air quality impacts include wildland fire, dispersed recreation, and road construction and maintenance. These activities are principally contributing volume source particulate matter emissions and fugitive dust to the air quality impacts; however, products of combustion are also emitted.

Historic wildland fires (1981-2008) have burned approximately 365,228 acres within the Air Quality CESA, which is approximately 16.5 percent of the Air Quality CESA. Approved mineral exploration and mining Notices and plans of operations total approximately 13,315 acres of surface disturbance, which is approximately 0.6 percent of the Air Quality CESA. ROWs, covering approximately 28,311 acres issued within the Air Quality CESA were issued for facilities that have the potential to create surface disturbance or impact air quality. In addition, the Burning Man event, located in the Black Rock Desert, annually results in temporary disturbance of approximately 4,400 acres. A portion of Interstate 80 is located within the Air Quality CESA and the vehicular emissions from this segment were estimated and are shown in Table 4.4-1.

Table 4.4-1: Vehicular Emissions from I-80 within the Air Quality CESA

	Emissions (pounds per hour)						Emissions (tons per year)					
Section	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC	PM_{10}	$PM_{2.5}$	CO	NOx	SO_2	VOC
I-80 Paved	0.75	0.73	6.59	24.41	0.27	1.08	3.26	3.21	28.87	106.90	1.16	4.74

1 - Based NDOT traffic counts and EPA emission factors.

Two operating mines are located within the Air Quality CESA and are operating under BAPC Class II Operating permits. The Springer Mine stationary emission sources, as outlined in Permit No. AP1041-0106.03, include waste rock transfers and tungsten ore stockpiles, ore conveyor transfer, molybdenum precipitation circuit, natural gas boilers, wet milling, wet and dry product transfers, baghouse operations, and primary and secondary ore crushing (this facility has not yet been constructed). The Florida Canyon Mine stationary emission sources, as outlined in Permit No. AP1061-2442) include loaders, rock hoppers, jaw crusher, conveyors, crushers, radial stackers, lime silos, furnace, kilns, steam boilers, and mercury retorts. These permits specify emission limits for air pollutants in order to control the contributions of pollutants to the air basin. In addition, the existing Hycroft Mine operations are permitted under a Class II Operating Permit as discussed in Section 3.2. The vehicle emissions at the existing Hycroft mine likely result in an exceedance of the 1-hour SO_2 and NO_2 ambient air quality standards. Table 4.4-2 summarizes the permitted criteria pollutant emissions from the three facilities, based the current air quality permits.

Table 4.4-2: Criteria Pollutant Emissions from Existing Mining Operations.

Facility	Emissions (tons per year)			
	PM_{10}	SO_2	NO_2	CO
Hycroft	78.23	1.99	20.96	0.43
Florida Canyon	27.68	0.01	4.90	2.82
Springer	19.62	0.08	24.48	10.82
Total	**125.13**	**2.08**	**50.34**	**14.07**

RFFAs: RFFAs within the Air Quality CESA that may contribute to impacts to air quality include dispersed recreation, transportation, mining and mineral exploration (213 acres of pending Notices and Plans of operation), transmission line construction, wind energy projects, and wildland fires. The Jungo Landfill is also proposed to be constructed within the Air Quality CESA increasing truck traffic. Air quality impacts from RFFAs could include generation of fugitive dust during hard rock mining and exploration. Emissions may also be generated from processing facilities, burning of fossil fuels by heavy equipment and other vehicles, vehicle travel on paved and unpaved roads, fugitive dust from travel on unpaved roads, and wildland fires. Some of these emissions would be localized and subject to BAPC air quality permits and compliance, development of mitigation measures, and implementation of operational performance standards. Others would be more long term and basin wide.

Cumulative Impacts: Each of the identified individual projects within the CESA, including existing and proposed mining operations, emit air pollutants. With the possible exception of motor vehicle emissions, the existing and proposed mining operations are the major sources of criteria pollutants within the CESA. The modeling for the Proposed Action shows that the levels of these pollutants are below the applicable standards, except for the 1-hour NO_2 and SO_2 NAAQS, which result from motor vehicle emissions. The Proposed Action would result in a significant cumulative impacts to Air and Atmosphere Resources. The RFFAs would result in additional emissions similar to those currently emitted by the existing operations within the CESA. In addition, the major sources of pollutants (except for motor vehicle emissions) within the CESA would operate under permit conditions established by the BAPC. However, the cumulative effects to air quality would be significant as a result of the Proposed Action due to the exceedances in the 1-hour NO_2 and SO_2 NAAQS.

4.4.2 Cultural Resources

The CESA for cultural resources is the Cultural Resources CESA, which includes 63,850 acres and is shown on Figure 4.2.1. This area encompasses several historic mining districts.

Past and Present Actions: Most past actions did not consider potential effects to cultural resources. Projects and development disturbances conducted prior to 1966 (i.e., prior to NHPA) or those activities without a federal or state nexus generally did not identify or quantify cultural resource sites or impacts to them. Cultural properties tend to degrade over time due to natural forces; however, many survive for hundreds or thousands of years. Modern human activity tends to exacerbate the damage and as a consequence cultural resources are being damaged and disappearing at an increasing rate. Many of the recorded cultural resources in the CESA exhibit impacts as a result from modern use of the land. Grazing damage is found at virtually all recorded sites, and sites are likely to have sustained damage from previous mining and mineral exploration, road construction, fences, agricultural practices, oil and gas exploration, recreation,

wildfires and erosion resulting from these activities. Although difficult to quantify, the paucity of artifacts at some sites may be due to removal by artifact collectors.

Another factor that leads to the loss of cultural resources and archaeological data is the imperfect nature of cultural resource management and archaeological research. Intensive cultural resource inventories (100 feet between transects) are meant to identify most cultural resources within the inventory boundary, but result in some smaller sites and low density sites being overlooked. The overall success rate depends on many factors including transect spacing, training/experience of the field crew, surface visibility, lighting, time of day, difficulty of the terrain, etc. Once a cultural resource is discovered, information is gathered by closely scrutinizing the site area and sometimes excavating small probe units to determine if subsurface deposits are present. This information is documented in site forms and inventory reports that include National Register eligibility recommendations. The federal agency then makes a formal determination of eligibility and project effects based on the report and any other available data. Given that eligibility determinations are based primarily on sites' surface characteristics, there is room for error given that surface manifestations do not always accurately reflect the nature and density of subsurface deposits. Other factors at play are the differences of opinion among professional archaeologists as to what research (and therefore archaeological sites) is important, and the evolving nature of archaeological research. In some cases, sites now thought to be lacking the ability to answer important questions may become important as archaeological method and theory progress but may not be preserved. The courts have determined that cultural resource management standards such as those employed for the current Project meet the objectives of the NHPA and other pertinent statutes, but this does not necessarily imply that there are not project-specific or cumulative losses of cultural resources or information important to understanding the past.

Quantifiable past and present activities within the Cultural Resources CESA that have the potential to contribute to degradation of cultural artifacts include the 8,033 acres of approved and closed mineral exploration or mining disturbance (approximately 13 percent of the CESA), 2,887 acres of historic fires (4.5 percent of the CESA), and 1,449 acres of ROWs that have the potential to create surface disturbance.

RFFAs: Grazing, mining and mineral exploration (49 acres of a pending Sand and Gravel Operation), dispersed recreation, and wildfires are likely to continue within the cultural resource CESA.

Cumulative Impacts: All adverse effects under the NHPA and direct and indirect impacts under NEPA to known-eligible properties identified within the Project APE would be mitigated in accordance with the PA and the treatment plan prepared for the Project. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Therefore, no mitigation or monitoring is recommended outside of the indirect and direct effect area that is outside of the proposed Project Area boundary. Any previously unknown-eligible properties that may be discovered during construction activities would be mitigated in accordance with the PA. Cumulative effects to cultural resources would include reasonably forseeable incremental impacts in the form of unauthorized artifact collection and inadvertant disturbance in the CESA caused by increased human activity. Cumulative effects would also impact the historic trails in the form of incremental visual intrusions to the existing setting (shape of the landscape) of the trails.

Mitigation for visual impacts to the trails would be implemented in the form of reclamation activities that would decrease the visual changes caused by mining exploration and operations.

4.4.3 Geology, Minerals, and Energy

The CESA for geology, minerals, and energy is the Geology CESA, which includes 23,350 acres.

Past and Present Actions: Past and present actions within the Geology CESA include primarily mining-related actions. Most past mining operations were generally of a smaller scale than the Project, and consisted of exploration, open pits, and underground operations. Historically, this area has been mined for gold, silver, sulfur, and alunite. Present actions are surface mining operations that affect geology and mineral resources by excavating, modifying, or covering existing topographic and geomorphic features and by removing mineral resources. Quantifiable past and present surface disturbance from mining-related actions within the Geology CESA include approximately 8,012 acres.

RFFAs: RFFAs that have the potential to affect geology, minerals, and energy are primarily sand and gravel extraction activities (48 acres). HRDI is also exploring for geothermal resources within the Project Area, principally on private land.

Cumulative Impacts: Impacts to geology, minerals, and energy from the Project would be limited to open pit mining-related actions, such as excavation, which would result in the permanent removal of the identified mineral resource, and the exploration for geothermal resources. HRDI has identified approximately 306 million tons of ore and 436 million tons of waste rock. The mineral reserve estimate is based on a 0.005 ounce per ton gold equivalent cutoff grade. The reserve includes 2.5 million ounces of gold and 49.3 million ounces of silver. Therefore, the Proposed Action includes the extraction of approximately 737 million tons of material from the Project Area that disturbs 2,172 acres. Impacts to geology, minerals, and energy would be localized within the Project Area; therefore, cumulative impacts, as a result of the Proposed Action when added to past and present actions and RFFAs, are expected to be minimal. No mitigation measures are proposed.

4.4.4 Migratory Birds

The CESA for migratory birds is the Watershed CESA, which includes 124,903 acres.

Past and Present Actions: Past and present actions that have potentially impacted migratory birds include mining and mineral exploration, wildland fires, ranching operations (grazing), road construction and maintenance, or dispersed recreation. Impacts to migratory birds have resulted from the following: 1) destruction of habitat associated with road building; 2) disruption from human presence or noise such as mining equipment and drill rigs, water trucks and four-wheel drive pickups; or 3) direct impacts/harm to migratory birds that would result if vegetation containing viable nests were cut down or ground nests destroyed by construction or ranching equipment. There are no specific data that quantify impacts to migratory birds as a result of grazing or recreation. However, impacts to migratory birds from recreation activities would include destruction of native vegetation or nesting areas from off road vehicles that traveled off of established roadways. Impacts to migratory birds from grazing include trampling and

consumption of vegetation or nesting areas near streams, springs, or riparian areas. Impacts from wildland fires would include total destruction of the existing habitat and alteration of the habitat thereafter.

Historic Fires (1981-2008) have burned approximately 2,890 acres in the Watershed CESA (2.3 percent of the CESA). Past and present mineral exploration and mining Notices or plans of operation total approximately 8,004 acres (approximately six percent of the CESA). State and federal regulations require project operators of Notices and plans of operation to provide financial assurance to guarantee that surface disturbance due to mineral activities would be reclaimed. Therefore, the Notices and plans of operation within the Watershed CESA have reclamation bonds to guarantee that the 8,004 acres of authorized surface disturbance would be reclaimed when mineral exploration and mining activities have been completed. Approximately 1,449 acres of ROWs were issued within the Watershed CESA that have the potential to create surface disturbance and disturb migratory bird habitat and vegetation. The majority of the Watershed CESA is located within an active grazing allotment and livestock grazing and associated management, as well as other surface disturbing activities, contributes to the spread of invasive species, which can have an indirect effect on migratory birds. In addition, bird use of unprotected industrial ponds can cause mortalities to migratory birds.

However, disturbance to migratory birds from past and present actions would have been reduced through reclamation and seeding of disturbed areas and natural recolonization of native species. The past and present actions that are quantifiable have disturbed approximately ten percent of the CESA.

Reasonably Foreseeable Future Actions: Potential impacts to migratory birds from grazing, dispersed recreation, roads, ROWs, minerals activities or loss of native vegetation associated with potential wildland fires could occur. There are no specific data on the potential impacts to migratory birds or their habitat as a result of dispersed recreation, grazing, or potential wildfires. No pending ROWs were recorded in the Watershed CESA. Approximately 48 acres of a pending sand and gravel operation is present within the Watershed CESA.

Cumulative Impacts: Impacts to migratory birds and their habitat from the Proposed Action would be limited to the removal of vegetation, or destruction of habitat (up to 2,172 acres), an increased mortality rate due to the ponds, and noise associated with mining activities. These impacts would be localized and minimized due to implementation of environmental protection measures and mitigation measures required by the BLM (e.g., migratory bird nest surveys during the nesting season to comply with the MBTA). The Proposed Action would affect less than two percent of the Watershed CESA. Based on the above analysis and findings incremental impacts to migratory birds as a result of the Proposed Action when added to the past and present actions and RFFAs are expected to be minimal.

4.4.5 Recreation

The CESA for recreation is the Recreation CESA, which includes 576,596 acres.

Past and Present Actions: Past and present actions within the Recreation CESA have included the following: grazing and agriculture; utilities and infrastructure; wildland fires; dispersed and specific recreation; and mineral development and exploration. Cumulative disturbance associated

with these activities totals approximately 103,471 acres, which impacted approximately 18 percent of the Recreation CESA. These past and present actions include the existing mining operations at the Hycroft mine site and the annual Burning Man festival located in the Black Rock Desert.

RFFAs: RFFAs that have the potential to affect recreation are primarily sand and gravel extraction activities (48 acres) and the annual Burning Man festival (4,400 acres). In addition, wildland fires are also expected to occur within the Recreation CESA, but cannot be quantified. The quantifiable RFFAs would impact approximately 0.8 percent of the CESA.

Cumulative Impacts: Cumulative impacts to recreation from the Project include short- and long-term loss of public lands for recreational usage, and public access to the Project Area. The Proposed Action (5,235 acres) would impact approximately 0.9 percent of the CESA. Impacts to recreation would be temporary and minimal; therefore, cumulative impacts, as a result of the Proposed Action when added to past and present actions and RFFAs, are expected to be minimal. No mitigation measures are proposed.

4.4.6 Social Values and Economics

The CESA for social values and economics is the Social Values and Economics CESA, which includes 13,373,721 acres.

Past and Present Actions: Past and present actions within the Social Values and Economics CESA include the following: grazing and agriculture; utilities and infrastructure; wildland fires; recreation; land development; mineral development and exploration; and geothermal leasing. Impacts to social and economic values from these activities include increased population, increased demand for public services, increased employment opportunities, increased revenues for the communities within the CESA, and increased expenditures by the communities within the CESA. The extent of these impacts vary with the type of activity and have not been quantified; however, the majority of the impacts from past and present activities do not have any ongoing impacts and are considered to be part of the existing social and economic climate within the CESA.

RFFAs: Social and economic values impacts would result from the following RFFAs: grazing and agriculture; utilities and infrastructure; wildland fires; recreation; land development; mineral development and exploration; hazardous and solid waste; and geothermal leasing. Specific projects that are planned include: water and wind generation facilities; specific recreation activities such as the annual Burning Man festival; land sales; mining and exploration plans of operation and notices; sand and gravel extraction operations; and a proposed municipal solid waste landfill in the City of Winnemucca.

Cumulative Impacts: The identified projects within the CESA, including the Proposed Action, would have an impact on social values and economics. Cumulative impacts, as a result of the Proposed Action when added to past and present actions and RFFAs, are expected to be minimal or beneficial. No mitigation measures are proposed.

4.4.7 Soils

The CESA for soils is the Watershed CESA, which includes 124,903 acres.

Past and Present Actions: Past and present actions that have potentially impacted soils include mining and mineral exploration, ranching operations (grazing), road construction and maintenance, ROWs, wildland fires, or dispersed recreation. Impacts from these activities include loss of soils productivity due to changes in soil physical properties, soil fertility, soil movement in response to water and wind erosion, and loss of soil structure due to compaction.

Historic Fires (1981-2008) have burned approximately 2,890 acres in the Watershed CESA (2.3 percent of the CESA). Past and present mineral exploration and mining Notices or plans of operation total approximately 8,004 acres (approximately six percent of the CESA). State and federal regulations require project operators of Notices and plans of operation to provide financial assurance to guarantee that surface disturbance due to mineral activities would be reclaimed. Therefore, the Notices and plans of operation within the Watershed CESA have reclamation bonds to guarantee that the 8,004 acres of authorized surface disturbance would be reclaimed when mineral exploration and mining activities have been completed which would include the replacement of topsoil and growth media. Approximately 2,366 acres of ROWs were issued within the Watershed CESA that have the potential to create surface disturbance and disturb soils. The majority of the Watershed CESA is located within an active grazing allotment and livestock grazing and associated management contributes contribute to the erosion of soils particularly in drainages or riparian areas.

Reasonably Foreseeable Future Actions: Potential impacts to soils could result from grazing, dispersed recreation, roads, wildfires, ROWS, and minerals activities. There are no specific data on the potential impacts to soils from dispersed recreation, grazing, or potential wildfires. Impacts associated with RFFAs would be similar to the impacts described for past and present actions. No pending ROWs were recorded in the Watershed CESA. Approximately 48 acres of a pending sand and gravel operation is present within the Watershed CESA. Continued reclamation of past mining and exploration disturbance and future restoration activities would mitigate soil movement and productivity loss. Soil salvaged and used in reclamation would become viable and would be expected to return to pre-disturbance productivity once vegetation was established. Seeding and revegetation of areas that have been burned would reduce soil movement and loss.

Cumulative Impacts: The Proposed Action would disturb up to 2,172 acres of soils, which is approximately less than two percent of the CESA. In addition, these impacts would be localized and minimized due to implementation of environmental protection measures and BMPs. Therefore, the incremental impacts to soils as a result of the Proposed Action when added to the past and present actions and RFFAs would be minimal.

4.4.8 Special Status Species

The CESA for special status plant species is the Watershed CESA, which includes 124,903 acres. The CESA for special status wildlife species is the Special Status Wildlife CESA, which includes 122,438 acres.

Past and present actions that have potentially impacted special status species that may be impacted by the Proposed Action, (i.e. greater sage-grouse, golden eagle, western burrowing owl, BLM sensitive bats, and Crosby's buckwheat), include mineral exploration, ranching operations (grazing), road construction and maintenance, wildland fires, or dispersed recreation. Impacts to special status species from these activities include loss of forage, cover, and habitat as well as disturbance of mating and brood rearing practices.

Historic Fires (1981-2008) have burned approximately 2,890 acres in the Special Status Wildlife CESA (two percent of the CESA) and 2,831 acres in the Watershed CESA used to analyze special status plant species (two percent of the CESA). Approved and closed mineral exploration and mining Notices or plans of operation total approximately 8,107 acres in the Special Status Wildlife CESA (approximately seven percent of the CESA) and 8,004 acres in the Watershed CESA (approximately six percent of the CESA). State and federal regulations require project operators of Notices and plans of operation to provide financial assurance to guarantee that surface disturbance due to mineral activities would be reclaimed. Therefore, the Notices and plans of operation within the CESAs have reclamation bonds to guarantee that the authorized surface disturbance would be reclaimed when mineral exploration and mining activities have been completed. A total of 1,448 acres of ROWs were issued within the Special Status Wildlife CESA and 2,366 acres of ROWs were issued within the Watershed CESA that has the potential to create surface disturbance and habitat fragmentation and degradation for sensitive species. The majority of the Watershed CESA and Special Status Wildlife CESAs are located within livestock grazing allotments and associated management contributes to the spread of invasive species and change vegetation structure which can have an indirect effect on sensitive species. Other activities within the CESA including off-road vehicle use and any activity that disturbs soils including wildland fire also have the potential to introduce and spread invasive species. The existing Hycroft mine removed a portion of an existing Crosby's buckwheat population and habitat.

Reasonably Foreseeable Future Actions: Potential impacts to special status species from grazing, dispersed recreation, roads, ROWs, fence building, minerals activities or loss of cover, forage, or habitat associated with future wildland fires could occur. There are no specific data on the potential impacts to special status species as a result of dispersed recreation, ROWs or fence construction, grazing, or potential wildfires.

Cumulative Impacts: Loss of forage, cover, and habitat from quantifiable past and present actions that have impacted special status species total ten percent of the Special Status Wildlife CESA and less than 11 percent of the Watershed CESA. It can be assumed that some of the disturbance has been reclaimed, seeded, or otherwise revegetated, which would decrease the impacts further. In addition, all RFFAs would require avoidance or other mitigation for the protection of special status species and their habitat. The greatest impact to special status species is habitat alteration, which would occur from the past, present and RFFA's. The primary impact relates to changes in dominant plant communities that affect habitat for wildlife (i.e., conversion from sagebrush to grasslands). Wildfires combined with displacement of native species by invasive annual grasses such as cheatgrass are the primary factors that have altered the structure, composition, and ecology of plant communities in the CESA. Impacts to vegetation from recreation activities would include destruction of native vegetation from off-road vehicles that travel off of established roadways. Impacts to vegetation from grazing would include trampling of vegetation

near streams, springs, or riparian areas. Disturbed sites and recently seeded areas are candidates for invasion by undesirable species such as noxious weeds and cheatgrass.

The Proposed Action would disturb up to 2,172 acres of potential special status wildlife habitat and 46 acres of Crosby's buckwheat habitat including five acres of occupied habitat. An increase in wildlife injury and mortality is expected to increase as a result of the increased traffic volumes on the Project access roads and additional ponds. There would be no cumulative adverse impacts to any listed threatened or endangered species as none of these species are known to reside within the CESAs. Based on the above analysis and findings and implementation of the environmental protection measures and mitigation measures outlined in Sections 2.1.15 and 3.14.3 including a pre-disturbance migratory bird nesting survey, a burrowing owl clearance survey, bat exclusion from the Silver Camel mine workings, and Crosby's buckwheat mitigation, incremental impacts to special status species as a result of the Proposed Action when added to the past and present actions and RFFAs are expected to be limited.

4.4.9 Transportation, Access, and Public Safety

The CESA for transportation, access, and public safety is the Transportation CESA, which includes 204 acres and represents the Project Area and the section of Jungo Road from the Project Area east to Winnemucca.

Past and Present Actions: Past and present actions within the Transportation CESA include primarily mineral development and exploration activities, utilities and infrastructure, a minimal amount of wildland fire disturbance, and road maintenance. Past and present actions also include travel along Jungo Road to access the Project Area, and surrounding recreational, business, and geothermal activities.

RFFAs: RFFAs within the Transportation CESA include continued open pit mining and exploration activities, road maintenance, and continued travel along Jungo Road to access the Project Area and surrounding activities.

Cumulative Impacts: Cumulative impacts within the Transportation CESA include the following: increased vehicle traffic on Jungo Road; restricted public access to the Project Area; and greater impacts to public safety due to increased traffic on Jungo Road and increased hazardous materials transport. Cumulative impacts, as a result of the Proposed Action, and the conclusions drawn in Section 3.15, when added to past and present actions and RFFAs, are not expected to be significant. No mitigation measures are proposed.

4.4.10 Vegetation

The CESA for vegetation is the Vegetation CESA, which includes 1,389,498 acres.

Past and Present Actions: Portions of the existing Hycroft Mine have undergone concurrent reclamation, including the redistribution of growth media and the reestablishment of soil resources. Other past actions that have affected vegetation include the development of roads, power lines and other utilities, fences, development of cattle and wild horse water sources, livestock grazing, wild horse use, agricultural activities, dispersed recreation, and land development. Impacts to vegetation from these activities include removal of vegetation,

compaction, mixing, and erosion of soils. The extent of these impacts varies with the type of activity.

Historic Fires (1981-2008) have burned approximately 53,878 acres in the Vegetation CESA (approximately four percent of the CESA). Approved and closed mineral exploration and mining Notices or plans of operation total approximately 8,333 acres (less than one percent of the CESA). State and federal regulations require reclamation; therefore, it is reasonable to assume that some areas have been reclaimed and some areas have naturally revegetated over time. Approximately 8,606 acres of ROWs were issued within the Vegetation CESA that have the potential to create surface disturbance and remove or alter vegetation structure. Approximately 2,921 acres of irrigated cropland is present within the Vegetation CESA which has converted the native vegetation communities into agricultural fields. The majority of the Vegetation CESA is located within livestock grazing allotments and associated management contributes to changes in vegetation structure and the spread of invasive species. Other activities within the CESA including off-road vehicle use and any activity that disturbs soils including wildland fire also have the potential to introduce and spread invasive species.

RFFAs: Potential impacts to vegetation from grazing, road construction and maintenance, ROWs, minerals and mining activities, dispersed recreation, or wildland fires that alter the structure, composition, and ecology of plant communities in the CESA could occur. There are no specific data on the potential impacts to vegetation from dispersed recreation, grazing, or potential wildland fires. There are 72 acres of pending Notices, plans of operations, and sand and gravel projects within the Vegetation CESA.

Cumulative Impacts: Vegetation alteration would occur from the past, present and RFFAs due to reclamation of mining and exploration areas and disturbance associated with ROWs and seeding in burn areas that would favor herbaceous species over shrubs. The primary impact to vegetation relates to changes in dominant plant communities that affect habitat for wildlife (i.e., conversion from sagebrush to grasslands). Wildfires combined with displacement of native species by invasive annual grasses such as cheatgrass are the primary factors that have altered the structure, composition, and ecology of plant communities in the CESA. Vegetation impacts from reclamation of exploration roads and drill pads would initially alter the dominant vegetation communities, which would be converted to grass and forb species that can exist in the environment of northeastern Nevada, are proven species for revegetation, or are native species found in the existing plant communities. In time, the reclaimed and seeded areas should result in stable plant communities with densities that are similar to the pre-disturbance plant densities. Impacts to vegetation from recreation activities would include destruction of native vegetation from off-road vehicles that travel off of established roadways. Impacts to vegetation from grazing would include trampling of vegetation near streams, springs, or riparian areas. Disturbed sites and recently seeded areas are candidates for invasion by undesirable species such as noxious weeds and cheatgrass.

Quantifiable past and present actions and RFFAs (73,810 acres) have disturbed approximately five percent of the CESA. Some of the past actions are expected to have occurred far enough in the past that the disturbance has stabilized.

The Proposed Action would disturb up to 2,172 acres of vegetation (approximately 0.15 percent of the Vegetation CESA). This disturbance would not occur all at one time but potentially over a

12-year period followed by up to three years of reclamation and revegetation. In addition, the reclamation bond for the Proposed Action would not be released until the revegetation success criteria have been met. The incremental impacts to vegetation from the Proposed Action when added to the past and present actions and RFFAs would be minimal.

4.4.11 Visual Resources

The CESA for visual resources is the Visual Resources CESA, which includes a viewshed of 328,678 acres.

Past and Present Actions: The past actions that had the potential to affect visual resources were mining-related actions. Other past actions include roads, power lines, and buildings. The existing Hycroft Mine has already impacted the visual context of the area. Other present actions that had the potential to affect visual resources are agriculture related and general development actions. Most visual resource impacts resulted from surface disturbance associated with the actions and the structures created by the actions.

RFFAs: The RFFAs that had the potential to affect visual resources would be a continuation to the present mining-related, agriculture-related, utilities and infrastructure, and general development actions. Most visual resource impacts resulted from surface disturbance associated with the actions and the structures created by the actions.

Cumulative Impacts: There are many actions that have an effect on the visual resources within the vicinity of the Project Area. The BLM's visual management for the Project Area allows for substantial change to the visual characteristics of the area. Therefore, the cumulative impacts to visual resources from the Proposed Action, along with the past and present actions and the RFFAs would not be significant; however, activities to minimize the visual effects are incorporated in the Project reclamation plan.

4.4.12 Water Quality and Quantity (Surface and Ground)

The CESA for water quality and quantity is the Watershed CESA, which includes 124,903 acres. No impacts to ground water quality or quantity were identified in the Proposed Action or alternatives, so the cumulative analysis below addresses surface water quality.

Past and Present Actions: Past actions that have potentially impacted water resources include minerals activities, ranching operations including grazing and irrigation from wells, ROWs, road construction and maintenance, dispersed recreation, and wildland fires that introduced sediment to ephemeral streams or springs or consumed water within the Watershed CESA. Impacts from grazing could include cattle congregating around water sources causing bank trampling, which in turn can cause increased sedimentation. Increased sedimentation could also occur when vehicles or cattle use stream crossings or remove vegetation from the sides of the streams. There are no specific data that quantify the amount of sedimentation. In addition, cattle can degrade water quality by adding bacteria and nitrate from their waste.

Historical Fires (1981-2009) have burned approximately 2,831 acres in the Watershed CESA (approximately two percent of the CESA). Approved and closed mineral exploration and mining Notices or plans of operation total approximately 8,004 acres (approximately six percent of the CESA). State and federal regulations require project operators of Notices and plans of operation

to provide financial assurance to guarantee that surface disturbance due to mineral activities would be reclaimed. Therefore, the Notices and plans of operation within the Watershed CESA have reclamation bonds to guarantee that the authorized surface disturbance would be reclaimed when mineral exploration and mining activities have been completed. Therefore, areas reclaimed, would become naturally stabilized, decreasing the amount of sediment that reaches the waterways. Approximately 2,336 acres of ROWs were issued within the Watershed CESA that have the potential to create surface disturbance that could lead to sedimentation of waterways. The majority of the Watershed CESA is located livestock grazing allotments and associated management contributes to the erosion of soils and degradation of stream zones.

Reasonably Foreseeable Future Actions: Potential impacts to water resources could result from minerals activities, ranching operations including grazing and irrigation from wells, ROWs, road construction and maintenance, railroad maintenance, wildland fires, and dispersed recreation that could introduce sediment to ephemeral streams or springs or consume water within the Watershed CESA. There are no specific data on the amount of sedimentation or water use that could result from these activities. Impacts from RFFAs would be similar to those described for past and present actions. In addition, all RFFAs would require BMPs or other mitigation for the protection of water resources.

Cumulative Impacts: Disturbance to vegetation and soils (ten percent of the CESA) from past and present actions has impacted water resources; however, it is likely that some of the disturbance has been reclaimed, seeded, or otherwise revegetated, which would decrease the impacts from sedimentation. The past, present, and RFFAs would potentially directly affect surface water resources through increased erosion and sedimentation. The mining-related cumulative actions would be required to implement erosion control measures that would limit their contribution to the cumulative impacts. Grazing has its own set of requirements that minimizes effects to surface water quality. Dispersed recreation actions would not have the same requirements and thus would have a proportionally greater affect on surface water resources by removing vegetation and decreasing bank stability near streams and springs. The implementation of BMPs and monitoring activities would reduce the impacts to surface water quality from the Proposed Action and therefore the incremental contribution of the proposed surface disturbance activities would represent a minimal incremental cumulative effect to surface water quality in the Watershed CESA.

4.4.13 Wildlife

The CESA for wildlife is the Watershed CESA, which includes 124,903 acres.

Past and Present Actions: Past and present actions that have potentially impacted wildlife and wildlife habitat include mining and mineral exploration, wildland fires, ranching operations (grazing), road construction and maintenance, or dispersed recreation. Impacts to wildlife have resulted from the following: 1) destruction of habitat associated with road building; and 2) disruption from human presence or noise such as mining equipment and drill rigs, water trucks and four-wheel drive pickups. There are no specific data that quantify impacts to wildlife as a result of grazing or recreation. However, impacts to wildlife from recreation activities would include destruction of native vegetation from off road vehicles that traveled off of established roadways. Impacts to wildlife from grazing include trampling and consumption of vegetation in

areas near streams, springs, or riparian areas. Impacts from wildland fires would include total destruction of the existing habitat and alteration of the habitat thereafter.

Historic Fires (1981-2008) have burned approximately 2,890 acres in the Watershed CESA (approximately two percent of the CESA). Past and present mineral exploration and mining Notices or plans of operation total approximately 8,004 acres (approximately six percent of the CESA). State and federal regulations require project operators of Notices and plans of operation to provide financial assurance to guarantee that surface disturbance due to mineral activities would be reclaimed. Therefore, the Notices and plans of operation within the Watershed CESA have reclamation bonds to guarantee that the 8,004 acres of authorized surface disturbance would be reclaimed when mineral exploration and mining activities have been completed. Approximately 1,449 acres of ROWs were issued within the Watershed CESA that have the potential to create surface disturbance and disturb wildlife habitat and vegetation. The majority of the Watershed CESA is located within an active grazing allotment and livestock grazing and associated management contributes to the spread of invasive species which can have an indirect effect on wildlife. Other activities within the CESA including off-road vehicle use and any activity that disturbs soils including wildland fire also have the potential to introduce and spread invasive species. However, disturbance to wildlife from past and present actions would have been reduced through reclamation and seeding of disturbed areas and natural recolonization of native species. The past and present actions that are quantifiable have disturbed approximately ten percent of the CESA.

Reasonably Foreseeable Future Actions: Potential impacts to wildlife from grazing, dispersed recreation, roads, ROWs, minerals activities or loss of native vegetation associated with potential wildland fires could occur. There are no specific data on the potential impacts to wildlife or their habitat as a result of dispersed recreation, grazing, or potential wildfires. No pending ROWs were recorded in the Watershed CESA. Approximately 48 acres of a pending sand and gravel operation is present within the Watershed CESA.

Cumulative Impacts: Impacts to wildlife and their habitat from the Proposed Action would be limited to the removal of vegetation, or destruction of habitat (up to 2,172 acres), and noise associated with mining activities. These impacts would be localized and minimized due to implementation of environmental protection measures and mitigation measures required by the BLM. An increase in wildlife injury and mortality is expected to increase as a result of the increased traffic volumes on the Project access roads and additional ponds. The Proposed Action would affect less than two percent of the Watershed CESA. Based on the above analysis and findings incremental impacts to wildlife as a result of the Proposed Action when added to the past and present actions and RFFAs are expected to be minimal.

4.5 Cumulative Impacts from the No Action Alternative

As described earlier, under the No Action Alternative, the Proposed Action would not be approved. HRDI could continue mining and mineral exploration activities under their existing approved Plan and would be limited to a maximum of approximately 3,063 acres of surface disturbance on public and private land. This acreage on both public and private land could be reclaimed and released by the BLM and BMRR, based on compliance with the revegetation success release criteria; thereby, allowing HRDI to create additional disturbance.

Activities currently permitted in the existing approved Project Area, which are similar to those described for the Proposed Action, would continue. The total surface disturbance from the No Action Alternative would be less than those associated with the Proposed Action (3,063 acres rather than 5,235 acres), which relate to cumulative impacts for the following resources: Air and Atmospheric Resources; Cultural Resources; Migratory Birds, Soils, Special Status Species, Vegetation, Visual Resources, Surface Water Resources, and Wildlife. The cumulative impacts not related to surface disturbance but rather the qualitative impacts of the No Action Alternative are discussed for the following resources: Geology, Minerals, and Energy; Recreation; Social Values and Economics; Transportation, Access, and Public Safety; Wastes, Hazardous and Solid; Ground Water Quality and Quantity.

4.5.1 Air and Atmospheric Resources

Cumulative impacts to air resources within the CESA would result from the present and RFFAs when combined with this alternative; however, the incremental contribution of this alternative is less than the Proposed Action and would be relatively small. The cumulative emissions are generally dispersed and the stationary sources would be regulated by the BAPC to ensure that impacts would be reduced to levels that are consistent with the ambient air quality standards.

4.5.2 Cultural Resources

Under the No Action Alternative, the cultural sites determined to be present within the Project Area and subject to disturbance would not be impacted. Therefore, when combined with the past, present, and RFFA activities in the Cultural Resources CESA, impacts from the No Action Alternative are considered minimal.

4.5.3 Geology, Minerals, and Energy

Under the No Action Alternative, the known mineral resource within the Project Area associated with the Proposed Action would not be recovered and the exploration activities to further define mineral resources within the Project Area would not occur. Therefore, when combined with the other past, present, and RFFA mineral exploration and mining activities within the Geology CESA, the cumulative impacts No Action Alternative are similar but less than the Proposed Action and considered minimal.

4.5.4 Migratory Birds

Cumulatively, the past, present, and RFFAs would result in potential impacts to migratory birds and their habitat. These impacts would be localized and current projects would include revegetation in order to restore habitat. Due to the small impact within the Watershed CESA, the impacts to migratory birds or their habitat from this alternative in combination with past and present actions and RFFAs would be minimal.

4.5.5 Recreation

Cumulative impacts to recreation as a result of this alternative would be less than the Proposed Action and in combination with past and present actions and RFFAs would be minimal.

4.5.6 Social Values and Economics

Under the No Action Alternative, the expansion of the Hycroft mine would not be approved and therefore not have the beneficial effects to the region associated with the Proposed Action. Therefore, the beneficial cumulative impacts to Social Values and Economics when combined with the past, present, and RFFA projects in the region would be similar to but less than existing Hycroft Mine.

4.5.7 Soils

Cumulatively, the past, present, and RFFAs would result in disturbance and removal of soils. These impacts would be localized; therefore, impacts to soils as a result of this alternative would be less than the Proposed Action and in combination with past and present actions and RFFAs would be minimal.

4.5.8 Special Status Species

Cumulatively, the past, present, and RFFAs would result in potential impacts to special status species and their habitat. These impacts would be localized and the recent development projects include varying levels of revegetation requirements to restore habitat. Due to the limited number of actions within the Special Status Species CESA, the impacts to special status species or their habitat from this alternative in combination with past and present actions and RFFAs would be minimal.

4.5.9 Transportation, Access, and Public Safety

Cumulative impacts to transportation as a result of this alternative would be less than the Proposed Action and in combination with past and present actions and RFFAs would be minimal.

4.5.10 Vegetation

Cumulatively, the past, present, and RFFAs would result in removal of vegetation. These impacts would be localized; therefore, impacts to vegetation as a result of this alternative would be less than the Proposed Action and in combination with past and present actions and RFFAs would be minimal.

4.5.11 Visual Resources

Cumulative impacts to visual resources as a result of this alternative would be similar to but less than the Proposed Action and in combination with past and present actions and RFFAs would be minimal. Under the No Action Alternative the lighting mitigation measures to reduce the existing dark sky impacts of the Hycroft Mine would not be implemented. Therefore, the cumulative impacts to dark skies would be greater than those of the Proposed Action.

4.5.12 Wastes, Hazardous and Solid

Cumulatively, the past, present, and RFFAs would result in potential impacts from wastes. These impacts would be localized and the recent development projects include varying levels of reclamation requirements to maintain waste disposal. Due to the limited number of action within the CESA, the impacts to wastes from this alternative in combination with past and present actions and RFFAs would be minimal

4.5.13 Water Quality and Quantity (Surface and Ground)

Cumulatively, the past, present, and RFFAs would result in impacts to surface water resources. Due to the very limited impact within the Watershed CESA, the impacts to surface water quality and quantity from this alternative in combination with past and present actions and RFFAs would be minimal. Cumulatively, the existing and approved mining operations, the past, present, and RFFAs in the Watershed CESA would result in impacts to ground water quantity, but these uses would not exceed the basin allotment. Cumulatively, very few past, present or RFFA activities in the Watershed CESA would impact ground water quality; therefore, when combined with the No Action Alternative, impacts to ground water quality would be minimal.

4.5.14 Wildlife

Cumulatively, the past, present, and RFFAs would result in potential impacts to wildlife and wildlife habitat. These impacts would be localized and current projects would include revegetation in order to restore habitat. Due to the small impact within the Watershed CESA, the impacts to migratory birds, special status species, and wildlife or their habitat from this alternative in combination with past and present actions and RFFAs would be minimal.

5 MITIGATION AND MONITORING

5.1 Proposed Action

5.1.1 Applicant Committed Environmental Protection Measures

The following environmental protection measures included in the Proposed Action as outlined in Section 2.1.15 are reiterated below for reference:

Air Quality

Air emissions, including point and fugitive dust sources, would be controlled in accordance with the air quality operating permits for the Project and would be controlled in accordance with present BMPs shown in the *Hycroft Mine Dust Control Plan* and below in Table 2.1-13.

Cultural Resources

- Pursuant to 43 CFR 10.4(g), HRDI would notify the BLM authorized officer, by telephone, and with written confirmation, immediately upon the discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony (as defined in 43 CFR 10.2). Further pursuant to 43 CFR 10.4 (c) and (d), the operator would immediately stop all activities in the vicinity of the discovery and not commence again for a maximum of 30 days or when notified to proceed by the BLM authorized officer.

- HRDI would not knowingly disturb, alter, injure, or destroy any historical or archaeological site, structure, building, or object. If HRDI discovers any cultural resource that might be altered or destroyed by operations, the discovery would be left intact and reported to the authorized BLM officer.

- In order to prevent impacts to cultural resources, HRDI would avoid eligible or unevaluated cultural sites within the Project Area. HRDI would ensure that eligible or unevaluated cultural sites within the Project Area are mapped and flagged by a qualified cultural resource specialist with a GPS unit prior to surface disturbance.

Fire Management

HRDI would comply with applicable federal and state fire laws and regulations and would take reasonable measures to prevent and suppress fires in the area of operations. HRDI and contractors would be required to carry fire extinguishers, hand tools, or backpack-type water pumps in their vehicles to suppress small fires.

Hazardous Materials Management

Solid and hazardous wastes would be managed according to the *Solid and Hazardous Waste Management Plan* (HRDI 2010c). Used oil, antifreeze, diesel fuel, grease, oil, solvents, ammonium nitrate, emulsion, and Class A explosives would be utilized as part of HRDI's proposed activities. Approved staging facilities, safety measures, transportation, and handling requirements are already in use and would continue to be utilized for the proposed Project. Used materials would be recycled where possible.

Aerosol cans would be emptied and de-pressurized prior to disposal. Liquid drained from aerosol cans would be tested to determine their waste status and managed appropriately. Accumulation of pressurized cans would be minimized.

Hazardous waste would be stored in properly labeled storage containers, dumpsters, or barrels. Storage containers would be closed except when materials were being placed in the containers. The storage containers would be clearly labeled or marked with the dates when accumulation began and when the container was filled. Storage containers would be in good repair with no defects and would be suitable for off-site shipment under NDOT requirements. Hazardous wastes would be shipped to an approved location by a certified hazardous waste vendor in accordance with RCRA requirements.

Lighting

HRDI would utilize screening on proposed stationary lights and light plants. Lighting would be directed onto the pertinent site only and away from adjacent areas not in use with safety and proper lighting of the active work areas being the primary goal. Lighting fixtures would be hooded and shielded as appropriate. The Proposed Action would also modify or retrofit the existing lighting facilities. HRDI would utilize the lighting measures provided in the *Hycroft Mine Lighting Management Plan* (HRDI 2011a), which are designed to reduce the impacts to night skies.

Migratory Birds

Land clearing and surface disturbance would be timed to prevent destruction of active bird nests or young of birds during the avian breeding season and in accordance with the BRFO policies to comply with the MBTA. If surface disturbing activities were unavoidable during the breeding season, HRDI would have a qualified biologist survey areas proposed for disturbance for the presence of active nests immediately prior to the disturbance.

Wildlife Water Developments

HRDI would coordinate with the NDOW if the existing small game guzzlers are impacted by the Project development to relocate the affected guzzler. In addition, HRDI would work with the NDOW on the development of a new big game guzzler in the vicinity of the Project Area to offset potential loss of big game habitat.

Noxious, Invasive and Nonnative Species

HRDI would work with the BLM to prevent the spread of noxious, invasive, and nonnative species in the area affected by the expansion. The ongoing weed control program would continue in the area of the proposed activity. Employees and contractors would be educated to identify weeds that could occur in the area disturbed. Should invasive weeds be identified, HRDI would take appropriate measures to prevent their spread, as identified in the *Hycroft Mine Noxious Weed Monitoring and Control Plan* (HRDI 2010d).

Storm Water

BMPs would be used to limit erosion and sediment transport from proposed facilities and disturbed areas during construction and operation, in accordance with the Nevada General Storm Water Permit NVR300000 and the SWPPP. Following construction activities and in accordance with the BLM requirements, areas such as growth media stockpiles would be seeded as soon as practical and safe. Concurrent reclamation would be conducted to accelerate stabilization of disturbed areas.

In addition to the BMP inspections and reporting, an annual evaluation would be conducted, preferably following the spring runoff period. This evaluation would result in the preparation of a written report documenting the following:

- Inspection of areas contributing to storm water discharges containing pollution (i.e., sediment or product spills/leaks);
- Evaluation of BMPs for their effectiveness in reducing storm water pollutant loads; and
- Schedule for modifying the BMPs and revisions to the SWPPP, if practical reductions of pollutants can be achieved.

Monitoring

As part of the *Hycroft Mine Monitoring Plan*, HRDI proposes to monitor the following in compliance with state permits and other plans: air quality; WRFs and ore stockpiles; reagent and diesel storage; heap leach facilities; sediment controls; ground water; reclamation; noxious weeds; and wildlife (HRDI 2010e).

Reclamation and Closure

Reclamation of disturbed areas resulting from activities outlined in the Plan would be completed in accordance with BLM and NDEP regulations. The proposed disturbance areas are summarized in Table 2.2-1. The areas proposed for disturbance can be divided into the following: roads, heap leach facilities and process ponds, WRFs, stockpiles, buildings and equipment, and other ancillary areas. With the exception of the open pits, HRDI anticipates surface mine operations would be reclaimed and revegetated.

5.1.2 Recommended Mitigation Measures

The following mitigation measures are recommended:

Special Status Species

- **Recommended Mitigation Measure 3.14.3.3-3:** The nest removal should be coordinated with the USFWS. The nest removal should occur outside of golden eagle nesting season. Prior to the removal of the nest, a biologist should survey the nest to ensure that is not active.

- **Recommended Mitigation Measure 3.14.3.3-4:** During burrowing owl nesting season (March to late August), a burrowing owl clearance survey following the Winnemucca

BLM's survey protocol should be conducted prior to surface disturbance in the areas identified as potential burrowing owl habitat within the Project Area.

- **Recommended Mitigation Measure 3.14.3.3-6:** Bat exclusion activities should be conducted in the east and west Silver Camel workings prior to disturbance of this area. Exclusion activities should include the following: spreading exclusion materials (one-inch chicken wire or one-inch polyethylene avian netting) across the open workings, allowing bats to exit the site while discouraging their return; exclusions should be conducted at each opening with potential connection to the east and west Silver Camel workings prior to closure for a minimum of three to five nights; exclusion materials should be monitored nightly throughout the period of exclusion to reduce the potential for exclusion material collision stress, injury, and death; external surveys using night vision or thermal imaging equipment should be conducted to verify site vacancy; fire smoke bombs should be used on the final night of exclusion prior to closure; and physical closures should be conducted immediately following confirmation of vacancy. In addition to bat exclusion from the Silver Camel workings, warm and cold season surveys should be conducted in the vicinity of the Project for potential mitigation sites should additional mitigation be deemed necessary by the BLM.

- **Recommended Mitigation Measure 3.14.3.3-7:** Salvage and transplanting efforts should be conducted to preserve the genetics of the populations. Salvage activities should occur prior to any ground disturbing activities in the areas identified as Crosby's buckwheat habitat, as additional plants may have established since the last survey effort in the Project Area. The salvaged plants should be transplanted in three locations: one in the nearest suitable habitat outside of the Project Area; and at two different locations within the NCA or Wilderness Area where an established population already exists. Details of the transplanting effort and post-transplant monitoring should be further coordinated with local botanical experts to maximize the potential for success of the transplanting effort. As an additional measure, HRDI should provide funding towards the research and preservation of rare plants in Nevada.

Cultural Resources

- **Recommended Mitigation Measure 3.3.3.3-1:** HRDI should develop, and submit to the BLM for approval, a treatment plan to address the potential impacts to the 21 eligible sites within the Project APE area of direct impacts (i.e., proposed disturbance and facilities footprint) and the five sites most likely to be subject to indirect impacts. HRDI should implement the treatment plan prior to any surface disturbance of eligible sites within the area of indirect impacts and the five sites most likely to be subject to indirect impacts. A mitigation plan is a standard and effective approach to reduce adverse effects to cultural resources. Indirect impacts to eligible cultural resources other than the five sites mentioned above within the Project APE are not considered to be significant, at this time. If these resources would be directly impacted by future activities, a treatment plan should be developed to mitigate potential impacts.

  HRDI should develop and submit to the BLM for approval, a mine workers education program on the consequences of unauthorized collection of artifacts.

HRDI should install perimeter fencing delineating the proposed Project Area boundary within 180 days of ROD effective date to deter the public from visiting historic properties and potentially collecting artifacts.

HRDI should maintain existing eligible roads (CrNV-22-6274, 9717, and 9894 [Jungo Road]) during all phases of the Project within the limits of the existing eligible roads cross section as feasible considering all appropriate health and safety regulations (e.g., MSHA and OSHA, with the exception of CrNV-02-11443 [Seven Troughs Road], which would be relocated. Mitigation for adverse effects to this historic road should be described in the mitigation plan. HRDI should contract a qualified archaeological consulting firm, approved by the BLM, to provide quarterly monitoring for Year 1 and yearly monitoring for each subsequent year of eligible roads (CrNV-22-6274, 9717, and 9894 [Jungo Road] and CrNV-02-11443 [Seven Troughs Road]) to reduce the direct and cumulative effects of above described maintenance. Should damage be detected during monitoring, BLM may choose to consult with SHPO to determine if additional protective measures or further action to mitigate the impact are required.

In addition, HRDI (through a qualified archeological consulting firm) should conduct quarterly monitoring during the first year, and twice a year monitoring of a sample of other eligible sites within the indirect effects area. The sample would consist of ten sites (both historic and prehistoric) concentrating on those containing artifacts likely to be of interest to illegal collectors. After each monitoring visit, a letter report should be sent to the BLM within two weeks of the fieldwork.

5.1.3 Monitoring

As part of the Hycroft Mine Monitoring Plan, HRDI proposes to monitor the following in compliance with state permits and other plans: air quality; WRFs and ore stockpiles; reagent and diesel storage; heap leach facilities; sediment controls; ground water; reclamation; noxious weeds; and wildlife.

Air Quality

HRDI currently holds two air quality permits (Class II Operating Permit and Mercury Operating Permit to Construct) for the Hycroft Mine. Appropriate modifications to the air quality permits would be obtained from the BAPC for the new Project facilities and land disturbance. As per BAPC regulations, the project air quality operating permits must be authorized by the BAPC prior to project commissioning. Pollution control equipment is and will continue to be monitored according to construction and operating permits. Fugitive dust is and will continue to be monitored and controlled according to the *Surface Area Disturbance Dust Control Plan* as required by BAPC.

Waste Rock Disposal Facilities and Ore Stockpiles

Monitoring of the waste rock would continue in accordance with the Brimstone Water Pollution Control Permit and the rock characterization program currently underway in coordination with NDEP and BLM. This program would result in the development of a Waste Rock Management

Plan for the Hycroft operations. Temporary ore stockpile areas would be constructed and monitored in accordance with the water pollution control permit.

Reagent and Diesel Storage

Monitoring of the reagent and diesel storage areas is and would continue in accordance with the WPCP.

Heap Leach Facilities

Heap leach effluent is and would continue to be monitored as part of the WPCP. Operational flows are and would continue to be reported on a regularly scheduled basis, dependent upon individual facility parameters. Effluent quality and quantity parameters are and would continue to be provided to the NDEP in quarterly and annual reports. New and revised *Fluid Management and Monitoring Plans* would be submitted to NDEP as part of the WPCP modification, and copied to BLM under separate cover.

Sediment Controls

HRDI currently and would continue to monitor disturbed areas for signs of erosion, sediment accumulation and potential offsite discharges; and the chemical storage, dispensing and processing areas for signs of spillage or potential equipment failure in association with the storm water permit and water pollution control permit. Inspections of sediment controls include the following activities:

- Inspection of material handling areas for evidence of, or the potential for, pollutants entering the drainage and conveyance system (non-structural controls).

- Inspection of erosion control systems and sediment control devices (structural controls) in areas of material handling and along transportation corridors to verify that they are working effectively and/or to determine if maintenance is required.

Ground Water Monitoring

Ground water monitoring would be undertaken in accordance with the WPCP and other permits as required.

Reclamation Monitoring

The revegetation release criteria for reclaimed mine sites is to achieve as close to 100 percent of the perennial plant cover of selected comparison areas as possible. At the Hycroft Project, reference areas were selected from representative plant communities adjacent to the mine site, test plots, or demonstration areas or, as appropriate. These reference areas have been used for historic reclamation that was deemed successful. Future reclamation would continue to be monitored in accordance with BLM and NDEP guidance.

Noxious Weeds

HRDI monitors and would continue to monitor for the presence of noxious weeds in accordance with the *Hycroft Noxious Weed Monitoring and Control Plan*. Periodic observation of the weeds being managed is undertaken to identify new establishments and evaluate the effectiveness of the weed control program. Periodic monitoring of the Project Area identifies new infestations while they are small and can be effectively eliminated. Periodic monitoring identifies areas where prevention measures would be implemented to prevent weed infestation.

Wildlife Monitoring

Wildlife monitoring includes:

- Fences and netting installed to prevent access by avian wildlife, livestock, and larger wildlife are monitored on a routine schedule to check for breaches;
- Surveys would be conducted for proposed facilities as necessary to determine the presence and/or use by special status species; and
- The process water pond(s) are monitored on a daily basis for the condition of wildlife exclusion features and the presence of mortalities.

Mortalities are reported on a quarterly basis according to the NDOW's standard reporting forms.

Additional details regarding the monitoring plan are included in HRDI 2010e.

In addition to the monitoring activities outlined in the HRDI monitoring plan, should Recommended Mitigation Measure 3.14.3.3-7 be implemented, population and success monitoring of the transplanted Crosby's buckwheat populations should be conducted. Details for this monitoring activity, including schedule, frequency, and methodology, should be coordinated between the botanists overseeing the transplant and the BLM biologists.

5.2 No Action Alternative

There are no mitigation measures or monitoring recommended as part of the No Action Alternative other than those activities currently associated with the existing mining operations.

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6 LIST OF PREPARERS

6.1 BLM

Name	Title	EIS Area of Responsibility	Degree and Experience
Bureau of Land Management, Black Rock Field Office			
Rolando Mendez	Field Manager	Authorized Officer	B.S. Wildlife Management M.S. Forestry 30 years experience
Kathleen Rehberg	Geologist	Project Lead, Geology, Minerals, and Energy, Noise, Soils, Transportation, Public Safety	B.A. Geology Transportation – 22 years of experience
Gerald Moritz	BLM Contractor	EIS Project Assistant	M.S. Range Management 26 years experience
Lynn Ricci	Planning and Environmental Coordinator	NEPA Compliance	B.S. Biology 20 years experience
Kathryn Ataman	Archaeologist	Cultural Resources	Ph.D. Archaeology 24 years experience
Mark Hall	Archaeologist	Native American Consultation	Ph.D. Anthropology 19 years experience
Celeste Mimnaugh	Wildlife Biologist	Wildlife, Migratory Birds, Special Status Species	B.S. Range Ecology/Wildlife Habitat Management 7 years experience
Joey Carmosino	Outdoor Recreation Planner	Recreation and Visual Resources	M.A. Recreation Administration 5 years experience
Melanie Mirati	Wild Horse and Burro Specialist	Wild Horses	B.S. Wildlife Ecology and Conservation 8 years experience
Julie McKinnon	Realty Specialist	Lands, Realty, Access	Realty Specialist 4 years experience
Ron Pearson	Rangeland Management Specialist	Rangeland Management, Vegetation	B.S. Soils/Meteorology 25 years experience
Jeanette Black	Hydrogeologist	Water Resources	B.S. Geology 22 years experience
Craig Nicholls	BLM National Operations Center	Air Quality	B.S./M.S. Atmospheric Sciences 22 years experience
Rob Burton	Rangeland Management Specialist	Invasive, Nonnative Species	B.S. Environmental Science 12 years experience
Tom Olsen	Hydrogeologist	Geology (waste rock/geochemistry)	B.S./M.S./Ph.D. Geology 30 years experience
Fred Holzel	Geologist	Wastes (Solid and Hazardous)	B.S./M.S. Geology 22 years experience
Joshua Sidon	NLM National Operations Center	Social Values, Economics, Environmental Justice	Ph.D. Economics 6 years experience

6.2 Cooperating Agencies

Name	Title	EIS Area of Responsibility
Cooperating Agencies		
U.S. Environmental Protection Agency (EPA)		
Carter Jessop	Physical Scientist	Air and Water Resources
Nevada Department of Wildlife		
Kenny Pirkle	Biologist, Habitat Division	Wildlife, Special Status Species, Migratory Birds

6.3 Enviroscientists, Inc.

Name	Title	EIS Area of Responsibility	Degree and Experience
Enviroscientists, Inc. – EIS Third Party Contractor			
Richard DeLong	President	Project Manager, Technical Review, Geochemistry	M.S. Geology M.S. Resource Management B.A. Geology 25 years experience
Opal Adams	Vice President	Assistant Project Manager, Visual Resources, Noise, Technical Review	M.S. Geology B.S. Geology 30 years experience
Melissa Sherman	Senior Specialist/Resource Manager	Project Coordinator, Migratory Birds, Wildlife, Wild Horses, Invasive, Nonnative Species, Special Status Species, Vegetation	B.A. Geography 11 years experience
Catherine Lee	Senior Project Specialist	Chapters 1 and 2, Chapter 4, LR2000 Database, Recreation, Transportation, Access and Public Safety, Social Values, Realty, Environmental Justice	M.A. Geography 10 years
Keshab Simkhada	Senior Specialist	Air and Atmospheric Resources	M.S. Environmental Science 8 years experience
Kaitlin Sweet	Environmental Specialist	Geology, Minerals, and Energy, Soils	B.S. Hydrogeology 4 years experience
Lucy Downer	Senior Specialist	Wastes, Hazardous and Solid	B.S. Mining and Mineral Processing 12 years experience
Ed Stoner	WCRM, Principal Archaeologist	Cultural Resources	M.A. Anthropology 25 years experience
Steve Mehls	WCRM, Historian	Cultural Resources	Ph.D. History 33 years experience
Fred Marinelli	InTerraLogic, Senior Ground Water Hydrologist	Technical Reviewer –Water Resources	Ph.D. Civil Engineering M.S. Hydrology-Ground Water B.A. Geology 30 years experience
Brent Johnson	InTerraLogic, Senior Geochemist	Technical Reviewer – Geology, Minerals, and Energy and Water Resources	M.S. Geology-Geochemistry 19 years experience
Jim Buntin	Brown-Buntin Associates, Inc., Principal Consultant	Baseline Noise Collection and Reporting	B.A. Zoology Board Certification – Noise Control Engineering 38 years experience
Eric Herzik	Professor and Chair, UNR Department of Political Science	Technical Reviewer- Social Values and Economics	Ph.D. Political Science 29 years experience
Jess Kohler	GIS Specialist	GIS Data Management and Figure Production	B.S. Geography 8 year experience

7 CONSULTATION AND COORDINATION

7.1 Consultation with Federal, State, and Local Agencies

In preparing the EIS, the BLM communicated with and received input from federal, state, and local agencies, as well as private organizations and individuals. The following is a list of the agencies and private organizations that provided input:

Federal Government Agencies
United States Environmental Protection Agency
United States Fish and Wildlife Service
National Park Service

State Government Agencies
Nevada Department of Wildlife
Nevada Natural Heritage Program

Local Governments
None currently identified.

Private Organizations -
Hycroft Resources and Development, Inc.

7.2 Native American Coordination

The following federal legislation, regulations, and executive orders require government-to-government consultation between federally-recognized Native American Tribes and federal agencies prior to taking any action that would affect Native American Tribes, including the following: the National Historic Preservation Act; the Native American Graves Protection and Repatriation Act; the American Indian Religious Freedom Act; Regulations 36 CFR 800, sections 106 and 119; and Executive Order 13007 (Sacred Sites). BLM Manual Section 8160, entitled "Native American Coordination and Consultation", establishes agency policy regarding American Indians and integrates into all programs the management of resources valued by Native Americans.

The purpose of the government-to-government coordination process is to discuss the issues and concerns of a proposed Project with local Native American Tribes in the preliminary planning stages. Information gathered from the Native Americans would be used to develop Project alternatives and mitigation measures that would reduce the effects of the Project. In addition, the tribes have access to cultural resources reports prepared for the Project, as well as sections of the EIS before they are reviewed by the general public.

The BLM has conducted coordination activities with the following tribes:

- Fort McDermitt Paiute and Shoshone Tribe
- Lovelock Paiute Colony
- Pyramid Lake Paiute Tribe
- Shoshone-Paiute Tribes of Duck Valley
- Summit Lake Paiute Tribe
- Winnemucca Indian Colony

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8 PUBLIC INVOLVEMENT

To initiate the public scoping process, the BLM published the *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Hycroft Mine Expansion Project, Humboldt and Pershing Counties, Nevada* in the Federal Register (Vol. 76, No. 63, page 18243) on Friday, April 1, 2011. A news release was also issued by the BLM on Tuesday, April 5, 2011, that stated the comment period to accept public comments was open for 90 days until June 29, 2011.

The BLM also held three public open house meetings as follows:

- May 10, 2011 from 6p.m. – 8p.m. at 820 6th Street in Lovelock, Nevada;
- May 11, 2011 from 6p.m. – 8p.m. at 401 Cottonwood Street in Gerlach, Nevada; and
- May 12, 2011 from 6p.m. – 8p.m. at 50 West Winnemucca Boulevard.

Dates for these meetings were also announced in separate correspondence and on the BLM Winnemucca District Office's website at:
www.blm.gov/nv/st/en/fo/wfo/blm_information/nepa0.html.

The public scoping meeting on May 10, 2011 was held in Lovelock, Nevada, at the Lovelock Community Center. A total of six members of the public attended this meeting and three written comments were provided.

The public scoping meeting on May 11, 2011, was held in Gerlach, Nevada, at the Gerlach Community Center. A total of six members of the public attended this meeting, but no written comments were provided.

The public scoping meeting on May 12, 2011, was held in Winnemucca, Nevada, at the Winnemucca Convention Center. A total of ten members of the public attended this meeting and two written comments were provided.

The BLM will have a Notice of Availability for the Draft EIS published in the Federal Register. There will be a 45-day public review period following the publication in the Federal Register. There will be public meetings at the same three locations as for the public scoping meetings.

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10 GLOSSARY

Acoustical Terminology

AMBIENT NOISE LEVEL: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

DECIBEL, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

dBA Not all sound pressures are equally loud. This is because the human ear does not respond equally to all frequencies: we are much more sensitive to sounds in the frequency range about 1 kHz to 4 kHz (1000 to 4000 vibrations per second) than to very low or high frequency sounds. For this reason, sound meters are usually fitted with a filter whose response to frequency is a bit like that of the human ear. (More about these filters below.) If the "A weighting filter" is used, the sound pressure level is given in units of **dB(A)** or **dBA**. Sound pressure level on the dBA scale is easy to measure and is therefore widely used. It is still different from **loudness**, however, because the filter does not respond in quite the same way as the ear. To determine the loudness of a sound, one needs to consult some curves representing the frequency response of the human ear, given below.

DNL/L_{dn}: Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods. **NOTE:** The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum noise level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval (L_{90}, L_{50}, L_{10}, etc.). For example, L_{10} equals the level exceeded 10 percent of the time.

Air Resources Terminology

ATTAINMENT AREA: An air basin or portion of an air basin that has attained compliance with the adopted NAAQS for one or more than one criteria pollutants

NON-ATTAINMENT AREA: An air basin or portion of an air basin that has not attained compliance with the adopted NAAQS for one or more than one criteria pollutants

CRITERIA POLLUTANTS: Six common air pollutants namely particulate matter, ground level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead that are found all over the United States. These pollutants are regulated by the EPA by setting ambient standards to satisfy the human health-based and/or environmentally based criteria (scientific based guidelines) specified in the Clean Air Act

MIXING HEIGHTS: The depth of atmospheric mixed layer is known as the mixing height. It results from convective air motions, typically seen towards the middle of the day when the air at the surface is warmed and rises.

CO2(e) Is the carbon dioxide equivalent, which is a metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP. CO2(e) is expressed in metric tons.

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